

Louis

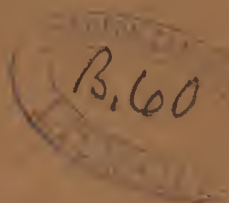
---

LOUIS' RESEARCHES  
ON  
EMPHYSEMA OF THE LUNGS.

TRANSLATED BY T. STEWARDSON, JR., M. D.

*For Dunglison's American Medical Library.*

---





RESEARCHES  
ON  
EMPHYSEMA OF THE LUNGS.

— ✓ —  
BY M. LOUIS,

PHYSICIAN OF LA PITIE, MEMBER OF THE ROYAL ACADEMY OF MEDICINE, ETC. ETC.

—  
TRANSLATED BY T. STEWARDSON, JR., M. D.

Physician to the Blockley Hospital; Recording Secretary of the Academy of Natural Sciences;  
Fellow of the College of Physicians, and Member of the Medical Society of  
Philadelphia, of the Société Médicale d'Observation of Paris, &c.

TRANSLATOR'S PREFACE.

The work of which the following is a translation forms a part of the first volume of the Memoirs of the Medical Society of Observation of Paris, recently published. It contains much new and valuable information in relation to Emphysema, derived from the analysis of a large number of cases of the disease observed chiefly in the wards of M. Louis. The translator being engaged in his studies, and in the habit of making daily visits to the wards of La Pitié, at the time that the author was occupied in his researches upon this subject, had thus an opportunity of observing for himself a portion of the patients referred to, and can bear testimony to the care and attention which were bestowed upon their examination. The cases are analysed numerically, and the conclusions of the author are limited to such as are directly deducible from the facts before him. The whole essay, indeed, is a beautiful specimen of that strict analysis and rigid induction based upon recorded data, from which medicine is beginning to derive so much advantage. To extend the sphere of its usefulness, and thus assist in promoting the more general adoption of the same philosophic method of investigation on which it has been conducted, is the principal object of the

TRANSLATOR.

Philadelphia, Jan. 13th, 1838.

Emphysema of the lungs, or dilatation of the pulmonary vesicles, to which the attention of observers was first drawn by Laennec, has been almost entirely neglected since the time of that illustrious physician; nevertheless, it is one of the most frequent and remarkable affections to be found in the whole catalogue of nosology, and one whose history most imperatively demands for its elucidation a large number of new and well observed facts. It is true that Laennec has described the greater part of the symptoms by which the

disease may be recognised, but there is a wide interval between the mere diagnosis of any given disease and its complete history; and it is this interval which the successors of Laennec are called upon to fill up. It is not for me to enjoy the satisfaction of accomplishing the task; I only hope that the analysis of the facts which I am about to give will not be found altogether useless, and that it will add something to our stock of positive knowledge in relation to emphysema.

The facts alluded to are contained in the histories of ninety cases, forty-two of which proved fatal, whilst the subjects of the others left the hospital more or less relieved. Of the last mentioned cases, nineteen were collected by J. Jackson; four of those first noticed also belong to him, and moreover are peculiarly interesting, as will soon be apparent, on account of the numerous details which they present, as well as their great exactness. The remainder were observed by myself, for the most part within two years—that is, since the period at which I commenced to give more attention to this subject than I had previously done. I may add that twenty-three of the patients who died were carried off by the cholera; and that although it was impossible to obtain an account of the symptoms which they previously had laboured under as a consequence of emphysema, their history is nevertheless of considerable value.

I shall present but few cases in detail, enough only to enable the reader to be sure of the diagnosis of the affection, and at the same time make him perfectly acquainted with the character of the cases which I have analysed. I shall commence by giving a general description of the affection, after which I shall present a more detailed account of the various lesions, and give a separate consideration to each symptom. Finally, I shall undertake to investigate certain questions which the study of the facts laid before the reader will warrant me in entering upon.

---

## CHAPTER I.

### GENERAL DESCRIPTION.

Both the age and constitution of the patients affected with emphysema were very various. In some the constitution was strong, either originally or at the time when they were under observation; in others, it was more or less delicate. A portion of them were under twenty years of age, whilst others were seventy and upwards; so that the mean age of those who left the hospital more or less relieved was forty years, and of those who died, sixty. This fact is very remarkable, and shows at the outset how exceedingly slow is the progress of the affection.

The period of life at which it commenced was very different in different individuals; oftentimes it showed itself in early youth, and even in infancy, by a greater or less amount of dyspnœa, which

prevented the patients from running as rapidly as their companions, and from entering fully into their sports, as they soon found themselves out of breath. Frequently, also, this symptom did not make its appearance till much later in life. Sometimes it existed alone; at others, it was accompanied with cough. Once established, it persisted for several years—in some cases without variation, in others more or less rapidly increasing in severity. In many patients, it became at intervals suddenly and violently augmented, so that, if they happened to be lying down, they were obliged immediately to place themselves in an upright position, or even fly to the window for breath. These paroxysms, which sometimes came on without any appreciable cause, were commonly induced by an attack of acute pulmonary catarrh, either alone or supervening upon a chronic catarrh. They continued for one or more days with greater or less severity, becoming less violent with the diminution of the catarrh, and finally disappearing along with it. These violent paroxysms rarely showed themselves at the commencement of the disease, but appeared to be inseparably connected with it at a certain period in its course, and augmented generally both in force and frequency as the patients advanced in life. They were commonly accompanied by palpitations, which became permanent in a number of instances. Under these circumstances, the lower extremities were frequently the seat of œdema, which disappeared as the paroxysms of dyspnœa passed off.

To these general or rational symptoms were joined local signs, the presence of which can leave no doubt about the diagnosis of the disease, of which the preceding account is already sufficiently characteristic. The conformation of the chest was altered; the thorax was more prominent upon one side than the other, and over a surface of variable extent. Over or around this prominence, the percussion was more sonorous than natural, and the respiratory murmur, on the contrary, more feeble. Frequently, also, a sibilant râle was heard in other parts of the chest, accompanied by great feebleness of the respiratory sound. The pulsations of the heart, though sometimes accompanied by impulsion, were often very feeble, especially when the prominence spoken of happened to be in the præcordial region. The general strength of the body was in an inverse proportion to the dyspnœa. When the latter was trifling, the former was but little diminished, so that the individuals affected could perform their usual labours, which were sometimes very severe, although with a little less energy than when in perfect health. When the dyspnœa was more severe, the strength diminished very much; so that, at a certain period of the disease, patients who had neither palpitations nor any symptom of affection of the heart, nor œdema, nor fever, and sometimes not even a pulmonary catarrh, or at most a very slight one, were obliged, merely on account of the severity of the dyspnœa, to avoid every species of labour; or if they did undertake any light work, it was but for a short time, when a paroxysm would come on and oblige them to enter a hospital.



Persons affected with emphysema lost neither flesh nor appetite, except during a paroxysm of dyspnœa, which was accompanied with intense pulmonary catarrh and fever. In the intervals of these attacks, in fact, the patients (I speak of those who were under 60 years of age) presented a healthy appearance, having neither heat of skin, frequent pulse, nor unnatural thirst. Moreover, this disease, however aggravated, was never alone the cause of death, which was mainly owing to some other affection subsequently developed; and, upon opening the body, the lungs were uniformly found to be the seat of a peculiar lesion. They did not collapse; they were more voluminous than natural, and sometimes overlapped one another at their free borders. This border was thicker than common, and when compressed between the fingers, in order to drive out the air which it contained, its tissue was found to be evidently more dense and not as thin as that of a healthy lung under similar circumstances. The pulmonary vesicles were dilated, and this dilatation, which existed in various degrees in the same lung, was sometimes so considerable that the vesicles, or at least some of them, were as large as a small pea. Occasionally, also, they were ruptured and looked like appendages to the border of the lungs. The bronchial tubes were not often dilated. The heart was hypertrophied and dilated in some cases.

The other lesions were in no respect different from those which are found in patients who die of any other disease.

We will now enter upon a detailed examination, commencing with the study of the lungs.

## ARTICLE FIRST.

### ANATOMICAL DETAILS.

§ I. *Of the Lungs.*—The lungs in those parts where the cells were dilated, yielded less easily to pressure than when in a healthy state, and, as above remarked, their tissue, after being deprived of air, was thicker than usual; that is to say, it was hypertrophied. But where was the precise seat of the hypertrophy? I answer, in the vesicles; at least every thing conspires to render this supposition probable; for it is a law of our economy that membranous tissues become thicker whenever they are distended from any cause. Thus the œsophagus is thickened in cancer of the cardia, the stomach in that of the pylorus, the intestines owing to any obstacle to the free course of the matter which they contain, the walls of the heart in dilatation of that organ, the ureters in organic diseases of the uterus, which contract the orifices by which they open into the bladder, &c. Besides, direct proof of the fact can be obtained by drying two lungs previously inflated, the one healthy, the other emphysematous, and then making very smooth sections of each in corresponding parts, when it will be clearly seen that the walls of the dilated cells are the thickest.

The precise determination of the above fact is especially important

on account of the influence which the thickening of the walls of the vesicles must have upon the phenomena of respiration. For whatever be the exact nature of the reciprocal action which the air and blood exert upon one another during respiration, it is clear that such an action really takes place, and must necessarily be affected by every thing which affects the dimensions of the pulmonary vesicles, and especially the thickness of their walls. Besides, it seems to me that this is almost the only way in which we can account for the dyspnœa in cases where there is no fever, where the blood circulates freely, and where the lungs appear to contain more air than natural. Supposing this view to be correct, we can conceive that emphysema might exist, even to a great extent, without at the same time causing much dyspnœa, provided in opposition to the general law the dilated vesicles were either not at all or very slightly thickened, as was perhaps the case in the subject of case No. 1. In like manner we can understand how hypertrophy of the vesicles, without any dilatation, should give rise to several of the symptoms of emphysema, or at any rate to oppression. But these views cannot be regarded as scientific truths, until they shall have been confirmed by experience. Let us regard them at present, then, as mere probabilities, and continue the detailed examination of the facts before us. The emphysema varied very much in extent in the different cases. Sometimes it was general and occupied the whole of both lungs, at others it occupied only one of these organs, and sometimes merely a portion of one or other of them. The distribution of these different cases was as follows:—

1. *In the nineteen cases who did not die of cholera.*

- Emphysema general throughout both lungs, 12 cases.
- “ general throughout left lung, 2 cases.
- “ general throughout right lung, 1 case.
- “ of left superior lobe, 2 cases.
- “ of right inferior lobe, 2 cases.
- “ of the two middle fifths of right lung, 1 case.

2. *In the twenty-three cases who died of cholera.*

- Emphysema general throughout both lungs, 6 cases.
- “ general throughout left lung, 3 cases.
- “ general throughout right lung, 1 case.
- “ of left superior lobe, 7 cases.
- “ of right superior lobe, 7 cases.
- “ of left inferior lobe, 1 case.
- “ of right inferior lobe, 2 cases.
- “ of middle and superior right lobes, 3 cases.

Hence it appears that in the first series, or those who did not die of cholera, general emphysema was found in two thirds of the cases; whilst among those belonging to the second series, it existed in only a fourth part.

This difference should not be regarded as accidental, for the mean age of the patients composing the first group was 60 years; that of the second, 50 years. Hence it appears that the extent of the affection is proportionate to its duration, and moreover that it is not general at the commencement, at least in a majority of cases. Besides, by uniting the two groups above mentioned, and then dividing them according as the individuals were above or below 50 years of age, we find that general emphysema occurred in fifteen out of thirty-one cases, who were over 50 years of age, while it existed in only three out of twelve of those who were less advanced, or who were 29, 38 and 40 years old respectively.

Further, as is evident from the preceding statements, the relative frequency of emphysema upon the right and left side is very nearly the same. In fact, general emphysema existed

On the left side in 23 cases;

On the right side in 20 cases.

Emphysema of the upper left lobe was found in 9 cases.

“ of the upper right lobe was found in 12 cases.

“ of the lower left lobe was found in 15 cases.

“ of the lower right lobe was found in 2 cases.<sup>1</sup>

In the remaining case the emphysema was limited, on the right side, to the middle lobe and the contiguous parts of the upper and lower lobes. And as the facts above detailed are sufficiently numerous, we may from thence conclude that very probably both lungs are equally subject to the disease. The extent to which it is carried, too, appears to be the same in each, for although it was most developed on the right side in four cases where the dilatation was general, the same was true of the left in an equal number, and in the remainder the size of the pulmonary vesicles was apparently the same on both sides.

Further, whatever was the extent of the dilatation, it was never uniform, the cells being more dilated in one part than another, and especially upon the internal surface and at the base of the lungs. When the vesicles, thus inordinately dilated, happened to be very numerous in a given point, they formed, by their reunion, flattened prominences of various forms and dimensions. It is also worthy of remark that in every case where the relative size of the vesicles was noted with great accuracy, (fifteen,) they were found more voluminous on the free border than elsewhere. This fact is important, and seems to show that emphysema is independent of pulmonary catarrh, or at least of that form of it which has its seat in the smaller ramifications of the bronchial tubes, and is marked by

<sup>1</sup> There is clearly an error in this table, which does not accord with the previous ones. It should stand as follows:—

Upper left lobe 9.

Upper right lobe 10.

Lower left lobe 1.

Lower right lobe 4.—*Translator.*



a subcrepitant râle, inasmuch as this form of catarrh, as we shall see hereafter, does not occupy the anterior portion of the lungs.

The free border of the lungs is so emphatically the part in which the cells have the greatest tendency to dilatation, that when the latter has arrived at its maximum, or when the vesicles have been ruptured, and thus have formed those peculiar appendices mentioned in the general description, it is still along the free border that this occurs, either anteriorly or at the base of the organ. These appendices were found in three cases, of which one only belonged to those attacked with cholera. Hence, in whatever way we view the two series of observations before us, we uniformly find that the extent and degree of the emphysema were always in direct proportion to the age of the patients, or to what in an extremely chronic complaint is the same thing, the duration of the disease.

Another remarkable fact, which confirms the result of the previous analysis, and shows that both lungs are equally disposed to become emphysematous, is that in the three cases just mentioned appendices were found on both the right and left sides.

The following case, although deficient in many respects in the history of the symptoms, is nevertheless sufficiently interesting in an anatomical point of view to be introduced here.

#### CASE I.

Cough for the last six years; oppression during five, aggravated during the last few, months—Pain in the larynx, and, at the same time, aphony—Epileptic paroxysms—Cancer of the larynx, general emphysema, with appendices—Dilatation and hypertrophy of the heart.

A man, aged sixty-eight years, at one time a workman in saltpetre, but who, for the last fifteen years, had been employed as a cook, was admitted into the hospital of La Charité, St. John's ward, the 18th of November, 1822. Of middle stature (five feet two inches), of a lively disposition, and generally in the enjoyment of good health, he had been attacked with an acute affection of the chest at the age of fourteen years, had been subject to cough for the last six, and to difficulty of breathing for the last four. The dyspnoea had become considerable five months since, and on this account the patient was obliged to enter the hospital for the first time, where he remained three months and a half. At that time, his voice was altered in character without being entirely lost; he was affected, at intervals, with palpitation of the heart, and complained of headache, to which he had been subject for many years, and which had very much increased during the last six; frequently, also, these headaches had been accompanied with dizziness, without loss of consciousness. At no time had there ever been pain in the throat, or the sides of the chest, or hæmoptysis. On the present, as on the previous occasion, the patient came to the hospital on foot, and was taken, immediately on his arrival, with loss of consciousness, trembling, agitation, accompanied with slight foaming at the mouth.

The following day, the 19th, emaciation very great, lips slightly of a violet hue, skin more or less tawny, or of an earthy tinge throughout; has no recollection of the spasmodic attack of the evening before; cheerful; no headache, no pain in the limbs, recollection accurate, lies with his head a little elevated, as has been his custom from childhood; respiration slow, a slight feeling of oppression in the middle portion of the chest, aphony, cough not frequent but very hard; a few expectorated masses of a grayish colour, and demi-transparent, or else greenish and opaque; percussion very sonorous throughout the whole extent of the chest; inspiration whistling, or rather a whistling noise during the expansion of the chest, without any respiratory sound except here and there when bronchial respiration is heard. Beating of the heart, accompanied with impulsion at the præcordial region and irregular, so that at every fifth beat there is one wanting; pulse scarcely accelerated, anorexia, no thirst; tongue whitish, furred; an obscure redness, slightly marked, upon the anterior half arch of the soft palate, on the right side; deglutition easy; belly flat, soft, not painful on pressure; two liquid stools as usual for last five or six weeks. (Pect. gum pot., with fifteen drops of the ethereal tincture of digitalis.)

From this time to the 12th of March, the day of his death, during a period of nearly four months, I made the following observations:

Auscultation and percussion were practised nineteen times, and always with the same results, except that sometimes the respiratory sound was entirely absent throughout the front of the chest; both the sibilant and sonorous râles varied in intensity at different times; and there was no paroxysm of dyspnœa.

The beating of the heart continued the same, both as regards the impulsion and the extent to which the sounds were heard; but their irregularity was so far from being permanent, that after the 22d of November they no longer presented that character; from this time the pulse was uniformly calm and regular, with only two exceptions of two days' duration, on the 14th of January and 11th of March. The loss of voice was permanent, and the cough continued hard (*déchirée*); the expectoration varied only in quantity, and it seemed to the patient as though it was detached from the neck, at a part which corresponded to the upper extremity of the sternum.

The appetite soon returned, so that by the middle of December the patient ate a demi-portion; this quantity, however, was afterwards diminished, in consequence of the spasmodic symptoms, which made their appearance on the 14th of January; notwithstanding this, however, the patient ate, on the 22d of the same month, a quarter; on the 25th, a half; and on the 28th, three quarters of a portion. Low diet was again resorted to, on account of a diarrhœa which supervened, and from this time to the day of his death, the patient took only soups. No difficulty of deglutition was apparent, except upon the 16th and 17th of January, when the patient returned a little of his drink by the nose. Nausea occurred

only once, and that was on the 3d of January, when the kermes mineral had been given in doses which had been successively increased to eighteen grains in the twenty-four hours. Previous to the 10th of December, there were three liquid stools a day, after which they were less frequent, or one a day, notwithstanding the administration of the kermes. On the 3d of February, the diarrhœa returned with greater severity than before, and so continued until the 15th, during which time the number of stools varied from six to ten a day, and afterwards from one to three.

The delirium, which had disappeared at the time of the first visit, returned upon the evening of the same day, the 19th of November, and was not completely dissipated until the 22d. On the 14th of January, at ten o'clock in the morning, sudden loss of consciousness, universal spasmodic movements extending to the muscles of the face, foaming at the mouth for two or three minutes, followed by a cadaverous paleness of the countenance, with enlargement of the right pupil, and considerable prolongation of its vertical diameter. Four minutes afterward this disorder disappeared, without the consciousness being restored. On the following day, the intellect was merely more dull than usual; on the 16th, there was delirium during the whole day, great restlessness during the two following nights, so that the patient had to be kept in bed by force, and his mind was not perfectly restored until the 21st. The delirium again returned on the 7th of March; on the 11th, about half an hour after the visit, return of the same symptoms as on the 14th of January; the prolongation of the right pupil having occurred a second time on the 17th of January, merely for a few hours.

The patient was bled from the right arm on the day following his admission into the hospital, on account of the cerebral symptoms; this operation was repeated the 16th of February, as well on account of a little tenderness at the epigastric region, as in consequence of the beating of the heart, which was heard over the whole chest. From the 16th of December to the 2d of January, the kermes was given in doses gradually increased from two to eighteen grains; afterwards it was discontinued, on account of nausea, and the oximel was employed instead, towards the end of the month, during ten days, after which it also was discontinued, on account of the diarrhœa.

*Examination of the body thirty-seven hours after death.*—*External condition.*—No oozing from the body; no infiltration; discolorations only on the posterior part of the body.

*Head.*—Numerous drops of blood upon the exterior surface of the dura mater; moderate infiltration under the arachnoid; an ounce of serum in each lateral ventricle, less limpid in the right than left; brain moist, but little injected; nothing else worthy of note.

*Neck.*—The epiglottis was healthy, but turned a little to the left. Immediately beneath it was found a white substance, hard, firm, difficult to cut, creaking under the scalpel, shining, without any distinct structure, extending backwards, and to the right side,

between the thyroid and cricoid cartilages, not extending superiorly above the level of the thyroid, and but a little behind the arytenoid cartilage of the right side, which was transformed into a substance resembling that above described, without, at the same time, being completely confounded with it. The cancerous mass above mentioned pushed the epiglottis a little to the left, was three quarters of an inch thick behind, a little less in front, and, consequently, was shaped like a wedge, the larger extremity of which looked toward the vertebral column. Softened, and of the consistence of cream, internally, it diminished very much the cavity of the larynx on the right side, where the vocal cords were destroyed; and this contraction was still further augmented by the development of another cancerous tumour, similar to the first but much smaller, and situated under the left inferior vocal cord, which was bent inwards. This latter, together with the upper one of the same side, was free from ulceration. The thyroid cartilage was healthy, the cricoid was ossified throughout its whole extent, and the arytenoid muscle of the right side terminated insensibly in the cancerous mass which occupied its place. The mucous membrane of the trachea was pale, and of the usual consistence and thickness throughout.

*Chest.*—Not a particle of serum in the cavities of the pleura; some loose cellular adhesion between them and the lungs. The latter did not completely fill the cavity of the chest; were of a reddish colour posteriorly, whilst in front they were whitish or grayish. The left one presented over its whole surface a remarkable dilatation of its cells, the size of which varied from that of a millet seed up to that of a cherry stone. These latter formed prominences, which, when opened, presented little round cavities, without any false membrane. These were rarely found, except upon the free border where the emphysema was much the most marked. Besides these, were found, along this free border, both superiorly and inferiorly, and at the base, three sorts of appendices of an elongated form, thin at their extremities, resembling, both as regards their shape and lightness, the air-bladder of fishes; emptying themselves completely when slightly pricked, like a leather bottle, and presenting internally several bands of cellular tissue, irregular and of a honeycomb appearance at their circumference. The vesicles of the right lung were not less dilated than those of the left, and, as in the latter, appendices were also found along its free border. These appendices were two in number: the one was as large as a medium sized nut, and did not entirely empty itself till after it had been twice pricked at its extremities; the other was larger, being nearly four inches long by one and a half broad, and in shape like a kidney. This last one was dried and then divided transversely at the distance of about an inch from each end, by which means its structure was found to be as follows:—One of the cut surfaces presented, at its centre, some vesicles smaller than a grain of millet seed, circumscribed by transparent partitions, and very thin. These cavities, or cells, became larger in proportion as you approached the circumference, near which their size was



equal to that of a grain of hemp seed, or even larger; they were of an irregular form, oblong, and, as it were, toothed. The other portion of the appendix was a little larger, and presented three principal vacuities of the size of a small nut, and traversed by cellular bands, and also cells, separated by very thin walls, shining like the coats of an onion, from three to four lines long by about as much in breadth, and traversed by several vessels which were not easily recognised by their colour. The posterior part of both lungs contained a considerable quantity of reddish serum, and at their summit was a small portion of demi-transparent grayish matter. The bronchial tubes were rather contracted than dilated. The pericardium was healthy, and the heart larger by half than natural. The walls of the left ventricle were seven lines thick about the middle, and those of the right from three to four at the point, and for an inch beyond it, but not more than half that thickness elsewhere. The free border of the tricuspid valve was opaque and a little thickened, without much hardness; that of the mitral valve more or less cartilaginous, and above it were found some yellowish plaques. The semilunar valves of the aorta were more or less cartilaginous at their base, and two of them had become converted into one, separated inferiorly by a thick septum. The aorta, at its origin, was of a dull yellow colour, and presented, throughout its whole extent, a great number of white, shining, semi-cartilaginous plaques, which studded the orifices of all the intercostal arteries. Besides these, there were also some yellowish plaques, three of which were ulcerated, blackish, and of a pulpy consistence upon the surface. The lesions above mentioned extended into the iliac arteries, as well as the popliteal and femoral, and especially the latter, where they were more advanced than in the femoral.

*Abdomen.*—Œsophagus healthy; stomach a little larger than natural. The entire surface of its mucous coat was covered with a pretty viscid mucus, mammelated, of a slate colour interspersed with reddish spots occasioned by finely injected vessels, thinner than natural, but of good consistence, except in the great cul-de-sac, where it was a little softened. The duodenum was healthy. The small intestine contained a little bile in its upper sixth, and below that mucus; its mucous membrane was perfectly normal. That of the colon was in contact with pulsatous fæcal matters, very much softened, and studded throughout its whole length with numerous crypts of the size of millet seed, except in the rectum, where they were a little larger. The liver and gall-bladder offered nothing worthy of note. The same was true of the bladder and kidneys. The spleen was scarcely a fourth of its usual size—its tissue firm and pale.

I shall not stop to consider all the various symptoms experienced by this patient, or the cancer of the larynx which certainly hastened his death; neither shall I speak of the heart, and especially of its right ventricle, the walls of which were so remarkable on account of the circumscribed hypertrophy of which they were the seats. I go on to observe that, contrary to what usually takes place in



analogous cases, the lungs did not entirely fill up the cavity of the chest. Notwithstanding this, the vesicles were exceedingly dilated; and in accordance with what was found in all the other cases in which this point was sufficiently attended to and noted, the greatest degree of dilatation existed near the free border of both lungs, and at the base of one of them, so that the appendices or excessive emphysema were found only in these parts. These appendices were remarkable in this—that when the cells did not appear to be evidently ruptured, the latter became larger as you approached the circumference: a circumstance which perhaps is true also of the lungs, but which it would be well to verify. I would also call attention to the fact, that, wherever the cells in the appendices were freely ruptured, the septa dividing them were also very thin, as if, contrary to what usually takes place, the walls of the cells in expanding had not become thicker. Unfortunately, I neglected to make use of the easiest means of determining this fact—that is, of pressing in different parts the tissue of the lungs, and determining whether, after being thus deprived of air, their parenchyma was thicker than natural, or offered any appreciable alteration in this respect. Hence, although the supposition that the walls of the vesicles were not thickened is exceedingly plausible, it cannot be regarded as strictly demonstrated. It is very plausible, because through its means we can account for the collapse of the lungs, and can also, perhaps, explain in a satisfactory manner, in accordance with views which I have already expressed, how, notwithstanding the lungs were so extensively diseased, the dyspnoea was so trifling.

The structure of the appendices as above detailed was found also in the two other cases in which they existed. Their lightness was remarkable in every case, and they emptied themselves almost entirely after a single prick—displaying internally a large cavity traversed by numerous filaments, whilst at their circumference existed numerous supple flattened vessels, probably venous, the diameter of some of which was half a line.

As the pulmonary vesicles are nothing more than the termination of the bronchial tubes, we should hence be led to conclude that both would be similarly affected; that when the vesicles were dilated, the bronchial tubes would also be so to a certain extent. This, however, is not the fact, as indeed Laennec has already stated; for, of thirteen cases in which the bronchial ramifications were examined with care throughout their whole extent, four only were examples of the dilatation of which we are speaking, and that confined to a few branches—a proportion which probably is not greater than would be found under other circumstances in persons of the same age as those of whom we are speaking.

Besides, we cannot suppose that in the above four cases there was any connection between the dilatation of the cells and that of the bronchial tubes, as the latter was found to be exceedingly limited in extent, whereas the former was general. It would further seem that mere chance had nothing to do with the above result;

for in two of the cases where the lungs presented appendices, and where the bronchial tubes were described with care, these last were not at all dilated, but appeared, on the contrary, to be rather smaller than usual in one of the cases (Case 2). I will just add, that where both lungs were emphysematous the dilatation of the bronchia was found only on one side, at least in the great majority of cases; and further, that although the vesicles were more enlarged near the free border of the lungs than elsewhere, the dilatation of the bronchial tubes was not particularly marked in that part. One of the succeeding observations affords a striking example of this fact.

Adhesions between the lungs and pleura were found in the great majority of the cases—in thirty out of thirty-six; and perhaps it would be natural to infer that the emphysema exerted some influence in the production of this lesion. But, in the first place, we must inform the reader that universal adhesions of both lungs did not exist in the same individual in a single case; that general adhesions of one side were found in only fifteen; that in the others they were limited to one of the lobes, and oftentimes to an extremely small portion of their surface: so that, in this respect, the facts before us are not very different from what we observe under other circumstances in persons not tuberculous. It should also be observed that the individuals, whose history we are analysing, were generally more advanced in life than those who die of most other diseases—which circumstance removes the difference above mentioned, or rather explains it, since the general causes of pleurisy had operated for a shorter time in the one case than in the other. But what renders it perfectly clear that the adhesions of the pleuræ were not dependent upon the emphysema, is, that the lungs were perfectly free throughout, in two out of the three cases in which the emphysema was greatest; and that, as usual, the adhesions, when they were not universal, were found on the posterior part, whilst the greatest degree of dilatation of the vesicles was found on the anterior part of the lungs.

Thus, on the one hand, the adhesions of the pleuræ, or rather the inflammation which gave rise to them, was governed by laws different from those of emphysema; whilst, on the other, the bronchial tubes were commonly healthy, and their dilatation, partial when it did exist, was probably not more frequent in the cases of emphysema than among those who die of any other disease. Hence it follows that, whatever may be the cause of the dilatation of the vesicles, we cannot regard as such either an inflammation of the surrounding parts or of the organs of which they are a continuation; neither can we admit that this dilatation becomes a cause of inflammation in the neighbouring textures. Thus, we see that every circumstance leads us to conclude that inflammation has nothing to do with the development of that form of emphysema which we are investigating, and that the thickening of the parietes of the vesicles, which might occasion some doubts in this respect, was in fact a simple hypertrophy, occasioned, as in most other similar cases, by mere distension.

There is still another lesion which deserves to be noted amongst those appertaining to the lungs—I mean tubercles. These, or gray demi-transparent granulations, were found in ten cases, and always in small number, except in one instance, where the gray demi-transparent granulations were pretty generally distributed. In fact, tubercles were rather less common in persons affected with emphysema than in those who died of other diseases, and whose history I have preserved; consequently, it is impossible to attribute their production in the least to the emphysema. Another proof of the correctness of this conclusion is found in the fact that the occurrence of tubercles was not more frequent in those cases where the emphysema was most advanced, than in those placed in opposite circumstances—for they were found six times among the latter, and only four in the former; or, in other words, they were rather more frequent among those who were carried off by the cholera, and in whom the emphysema was less advanced, than in the others. It would be easy to account for this difference, if the smallness of the number did not induce us to regard it as a mere coincidence, by recollecting that those who died of the cholera were younger than the others, and that the frequency of tubercles is always in an inverse ratio to the age. Nevertheless, as was mentioned before, the patients whose histories we are analysing had been subject to frequent attacks of pulmonary catarrh of various degrees of severity, and many of them had not been free from it for a number of years; so that this small series of cases, as far as it goes, shows us how wide is the difference between pulmonary catarrh and tubercles, as well as that the latter is totally independent of the former.

§ II. *Of the Heart.*—The condition of the heart deserves to be studied especially on account of the functional relations which exist between it and the lungs. The heart was larger than natural in sixteen cases, being double its usual size in one case, and rather more than double in two others. But these cases were not equally distributed among the two series of cases whose history we are examining. Six of them only belonged to the twenty-three cholera patients, whilst the remaining ten formed part of the nineteen individuals carried off by other diseases. The latter, as the reader will no doubt recollect, were more advanced in life than the former; and he will think perhaps that the difference above mentioned is owing to this cause, especially as the mean age of that portion of the cholera patients in whom the heart was found enlarged, was the same as that of the corresponding cases in the other series. But this view of the subject will be abandoned, and it will, on the contrary, be admitted that the emphysema itself had something to do with the production of this large number of cases of dilatation of the heart, as soon as I mention that the amount of enlargement of this organ was much the least among the cholera patients, in whom the emphysema was generally more marked than in the others.



## ARTICLE SECOND.

## EXAMINATION OF THE SYMPTOMS.

I shall begin with an account of the dyspnœa, after which I shall investigate successively the configuration of the chest, the results of auscultation and percussion, the cough and expectoration, the derangements of the circulation, and the condition of the digestive and nutritive functions. I shall then pass to the study of the diagnosis, causes, progress, and frequency of the disease; and, lastly, to its treatment. I shall examine the symptoms separately in those patients who died, and in those who left the hospital more or less relieved, commencing with the latter, whose history is most complete.

§ I. *Of the Dyspnœa.*—1. *In the patients who quitted the hospital more or less relieved.*—Dyspnœa occurred in forty-two out of forty-four cases where it was carefully studied. The two patients who thus present such a remarkable exception were aged, the one twenty-one years (a woman), and the other thirty (a man), and were not habitually subject to pulmonary catarrh. It is impossible that any doubt can exist in reference to the above statement, either as regards the absence of oppression, considering the care with which the patients were interrogated, or the correctness of the diagnosis, since both the individuals alluded to presented the symptoms of emphysema to a remarkable degree, and were repeatedly and carefully examined. Hence we must admit that pulmonary emphysema may exist without dyspnœa, at least for a time, and at a period probably not very remote from the commencement of the disease, which, however, it is impossible to determine certainly, unless the patients could have been observed from their infancy. Do the above cases belong to that class in which the dilatation of the vesicles takes place, or appears to take place, without hypertrophy?<sup>1</sup>

The oppression, after having once shown itself, continued without interruption in every case, except in a young man of eighteen years of age, who was not subject to catarrh, and who entered the hospital on account of a paroxysm of dyspnœa, of moderate severity, which disappeared in eight days. This was the second attack which this young man, who was very intelligent, had experienced. The first happened two years before, and lasted the same length of time, eight days; and in the interval the respiration had been perfectly free, whether the patient worked much or little, walked rapidly or slowly. In this case, too, as in those who never had dyspnœa at all, all the physical signs of emphysema were present, and were observed both during and after the paroxysm of dyspnœa. The period at which this symptom showed itself was very various. Its first appearance

<sup>1</sup> Quite lately I met with a well-marked case of emphysema in a woman of thirty years of age, who has never had dyspnœa. I interrogated her on three successive days in reference to this point, and each time she assured me that no one could go up six flights of steps more rapidly, and experience less difficulty of breathing.

was traced to infancy in sixteen patients, who recollected that they could never run as rapidly as other children of the same age, at least without being quickly put out of breath. In the twenty-six who remain, the dyspnœa commenced later in life; before twenty years of age in two cases, from twenty to thirty in seven, from thirty to forty in the same number, from forty to fifty in eight, from fifty to sixty in three. These facts are remarkable, and indicate that after the age of fifty years the occurrence of emphysema is scarcely to be feared, although, as previously stated, the lesion continues to increase after that period.

The oppression, commonly slight at its commencement, augmented after a lapse of time which varied very much in the different cases. In those in whom it showed itself during infancy, it was for the most part very trifling for a great length of time, so that of eleven patients of this class, it increased during childhood in only three, after the age of fifteen in another, and from twenty-two to fifty-eight in the remainder. In other words, the oppression, except in the three cases above mentioned, did not increase until about the same period at which it commenced in the others. This fact accounts, to a certain extent, for the advanced age of several of our patients, some of whom appeared to be very far from the termination of their career.

Of eighteen patients in whom the dyspnœa commenced later in life, and where it was carefully studied, twelve experienced it to a moderate degree and uniformly, for a period which varied from two to twenty-six years, or during a mean term of ten years. In the six others, the oppression went on gradually increasing from its commencement, and in two of them it was from the first pretty severe. The *paroxysms* of dyspnœa made their appearance, in the majority of cases, simultaneously with the augmentation of the oppression; this coincidence occurring in thirteen out of the seventeen patients in question. The paroxysms appeared later in the others, and were mostly slight with those who had been subject to oppressed breathing from their infancy, besides which they did not occur in more than half of the latter, or six out of thirteen.

Are the paroxysms in question really less frequent and severe in individuals who have been short breathed from their infancy, than with those who have experienced it for the first time later in life? or is it merely a coincidence? Time and observation will decide.

These paroxysms, the severity of which was sometimes extreme, frequently supervened as before stated, without any appreciable cause, but most commonly in consequence of an attack of acute pulmonary catarrh. In one case, for an account of which I am indebted to Mr. Boudier, they occurred only at night, at which time the patient was obliged to sit up, or even go to the window to breathe. I am unable to say whether atmospheric changes exert an influence upon their production, having neglected to obtain accurate information upon this point, which is in fact rather difficult to come at. But I am sure that if this influence is real, it is at any rate not constant. Of this fact I lately met with a convincing



proof in a woman sixty years of age, with whom the first symptoms of emphysema dated five years back, and whose dyspnœa both augmented and diminished, under the same atmospheric influences, during a residence of six weeks in the hospital.

This dyspnœa, so remarkable on account of the early period of life at which it so frequently commenced, of its duration, its permanency, its frequent exacerbations, unaccompanied, for the most part, by any other sign of disease of the heart; this dyspnœa, I repeat, was of itself very characteristic of emphysema. For it was impossible to attribute it to a simple habitual pulmonary catarrh, which was not present in every case where the oppression dated from about the twentieth year, or later, and was entirely absent in those where it dated from infancy, except in a single instance. It was equally impossible to refer it to a partial or general dilatation of the bronchial tubes, because the dyspnœa which sometimes accompanies the latter is of moderate severity, and especially is not paroxysmal. In some instances where there was complication of disease of the heart, the latter was only of a few years standing when the patients came under our observation, and did not by any means date from early life. Finally, the absence of hæmoptysis, and of the other symptoms of tuberculous disease, precluded altogether the supposition of phthisis. From all this it is evident, that dyspnœa, *such as it has been described*, is of itself sufficient to indicate, as it has in fact frequently indicated to us, the existence of emphysema of the lungs.

The following fact, for which we are indebted to J. Jackson, is a fresh proof of the value of dyspnœa as a diagnostic symptom in the affection before us. Out of one hundred and twenty individuals of whom he enquired into the state of the respiration from infancy, he found twenty-eight who had been subject to more or less shortness of breath since that time. Of the latter, one was affected with disease of the heart, two with phthisis, and the remainder with pulmonary emphysema. Hence it was concluded by the same physician that dyspnœa, the origin of which may be traced to infancy, and especially if it is paroxysmal, is a symptom almost pathognomic of emphysema. The following case, recorded by Jackson, shows that dyspnœa, even of no very great severity, is still highly important in the diagnosis of emphysema.

#### CASE II.

Dyspnœa from infancy, frequent palpitations dating from the same period; thorax generally more rounded than common, partial prominence on the right side anteriorly—Lungs not collapsed, coming in contact with one another at their edges; pulmonary vesicles dilated in the upper lobes and throughout the middle lobe of the right side, &c. &c.

Blauchon, weaver, aged 58 years, four feet five inches in height, hair grayish black, eyes gray, of a moderately strong constitution, was admitted into the hospital of La Pitié the 17th of June, 1833. Having been engaged in military service from his twenty-seventh to his thirty-sixth year, he had been attacked, when twenty-eight

years old, with a severe pneumonia, (cough, bloody expectoration, oppression, fever, delirium,) and afterwards, at the age of thirty-four, with a tertian fever. Subject to short breath from infancy, his dyspnœa had never much increased, even after the attack of pneumonia above mentioned. Since his twentieth year, he had been liable to frequent attacks of cold in the head, which lasted during the first few years from four to five days, and afterwards from ten to twenty, but never obliged him to suspend his daily avocations. From infancy, also, Blanchon has been subject to palpitations which increased after the attack of pneumonia, but were never very inconvenient, or accompanied by œdema of the lower extremities. Patient states that he was taken sick four months ago, was not obliged, however, to keep his bed, but had always been able to accomplish half a day's work.

At first, dry cough, augmentation of dyspnœa, chilliness; afterwards, persistence of the same symptoms with heat and sweats during the night; expectoration came on about the middle of May, and since March there has been diminution of appetite and progressive emaciation: no hæmoptysis, no pain in any part of the chest.

June 20th. Head elevated, expression of uneasiness and anxiety, lips a little livid, speech interrupted, memory sluggish, emaciation considerable, very little appetite, thirst great, tongue whitish and moderately moist; pain in the throat from coughing, digestion easy, stools not frequent, flying pain in the abdomen; tension and pain on pressure under the right false ribs, without any alteration in the form of the belly; cough very frequent, severe, and painful; expectoration greenish, opaque, not aerated, demi-liquid, or thicker; oppression great, respiration forty; thorax a little more convex anteriorly and posteriorly than common, right supra and infra-clavicular regions a little more prominent than the corresponding ones at left; on the right side, also, there was a slight partial prominence extending from the clavicle to the third rib along side the sternum; intercostal spaces ill defined on both sides; percussion every where sonorous, much more so behind on both sides, in the lower third of the chest, than elsewhere, and also a little more so under the left clavicle, for a distance of about two inches, than on the opposite side; sonoriety a little less in the præcordial region than in the corresponding point of the right side; respiration everywhere feeble, (except at the right summit,) more so at left than right, especially behind and laterally, a little less feeble at the left posterior and inferior third than at the summit of the same side. Immediately under the right clavicle and at about the same level posteriorly, the respiration was strong and very prolonged, with bronchophony at the latter point. Sonorous râle anteriorly throughout, subcrepitant râle in the right lower third behind. Pulse regular, not large, 72 in the minute: pulsations of the heart a little dull, heard throughout, with impulsion. Heat moderate, although the patient thinks it is very great; slight sweat at night; cephalalgia. v. s. 3 xii. on the 19th had produced a little relief.

21st. Subcrepitant râle on both sides behind, and even a little

anteriorly on the right side at the base of the chest; (one grain of opium in two doses).

23d. Evening. Pulse 90. The right arm, in which the bleeding had been performed, red, tense, swelled at the bend of the elbow, and painful from the armpit to the fingers; heat universal; (emollient cataplasms).

In the evening of the 25th, chills; 26th, whole right arm very much swollen; 27th, delirium, tongue brown, dry, and thick, pulse 120: the subcrepitant râle continued.

The same symptoms still persisted, accompanied by drowsiness, and the patient died on the 30th, at three o'clock in the morning.

His father had died at the age of 90 years, unaffected either with asthma or paralysis. His mother had deceased at the age of 22, and his brothers quite in early life; but he is not able to say what was the nature of the disease by which they were carried off.

*Opening of the body thirty hours after death. Exterior condition.*—Skeleton well formed; some discolourations on the abdomen and limbs; right arm a little larger than the left, at the elbow and near it, without œdema or redness; orifice where venesection was performed gaping; skin slightly thickened at the bend of the elbow for the length of three inches; the corresponding subcutaneous cellular tissue, yellowish, thickened, not elastic, very adherent to the veins and brachial aponeurosis; median basilic and cephalic veins firm, flattened, and double the usual size; same condition of the basilic and cephalic veins at their origin, for an extent of from two to four inches, from the radial and cubital veins near the bend of the elbow. The basilic vein contains no liquid; its walls are half a line in thickness, pale and polished, even in the neighbourhood of the axillary vein, where they are lined for an inch in length with a false membrane, of a rose colour, irregular, but slightly consistent, easily raised up, and which does not obliterate the cavity of the vessel. The median basilic is not less pale, and presents also internally a false membrane, which is only a few lines in length. The radial and cephalic veins are obliterated, near the bend of the elbow, for about an inch, by a reddish clot of tolerable firmness. The veins which are continuous with those of the arm are, like those of the left side, in a natural condition. The same is true of the arteries and nerves throughout the whole limb.

The articulations of the knee contained each about two table-spoonfuls of a purulent liquid, mixed with white flocculi; their surfaces are pale, except a slight injection in the neighbourhood of the adipose ligament. The other articulations are perfectly healthy.

*Head.*—A few glands of Pachioni; no infiltration under the arachnoid; pia mater very slightly injected; a small spoonful of clear fluid of the colour of wine lees, in each of the lateral ventricles. Nothing remarkable in the interior of the cranium.

*Neck.*—Larynx and trachea pale, without any appreciable changes from the natural condition.

*Chest.*—Lungs not collapsed, approaching one another at their



borders, but not absolutely in contact; adhesion at the summits much greater on the right side than on the left. In the same point, also, they are furrowed with wrinkles of from six to eight lines in length, deeper at right than left, across which pass, in the form of a bridge, small and thin cellular bands, which are likewise strongest on the right side. On the left side the upper lobe presents vesicles, varying in size from that of a grain of *semouille* to that of a small pin's head, both on its internal and external surface, over a third part of its extent, in the neighbourhood of the free border, which was rounded. Elsewhere the volume of the vesicles was not appreciable, so small were they. On the right side in the inferior third of the superior lobe, and only at its anterior portion, their dilatation was about the same as on the opposite side. The dilatation existed to about the same degree in the whole middle lobe, and for the length of two inches in the contiguous part of the lower lobe, extending laterally about as far as on the opposite side. Elsewhere the vesicles were scarcely or not at all apparent. The left lung was slightly infiltrated behind and inferiorly with a red fluid, whilst at the summit its tissue was indurated for a line and a half in depth. In the same part of the right lung there was found a cavity of the size of a nut, containing a small quantity of demi-fluid matter of a dirty white colour, and lined by a false membrane, which was irregular, soft, and easily detached from another one which was more polished and firm, and connected with the surrounding cellular tissue, which was dense for a line and a half beyond. The inferior lobe was like the corresponding one on the left side. There were no tubercles or gray demi-transparent granulations in either lung. Two bronchial tubes, which were neither red nor thickened, opened into the cavity of the right lung, and were continuous with a larger trunk, the mucous membrane of which was thickened. Nothing similar on the left side. The pericardium contained a spoonful of reddish serum; the heart was flabby, of the usual size, and contained coagulated blood. The internal membrane of the ventricles was of a red colour. The walls of the left ventricle were five lines thick, and those of the right a line and a half at the middle portion.

*Abdomen.*—Stomach of moderate volume, containing a small quantity of yellow fluid. Mucous membrane pale, mamelonated anteriorly in the pyloric half, and for two inches in breadth posteriorly, where it gave strips only two or three lines long. Small intestine moderately distended with gas, and by a small quantity of yellow or whitish liquid. Its mucous membrane was perfectly healthy, except in the middle third, where strips of only two or three lines could be raised. In the two last thirds of the large intestine were found hard fæcal matters. Its mucous membrane also was perfectly healthy, except in its first half, where strips of only four to six lines long were obtained. The liver was healthy, and the gall-bladder filled with a deep green fluid. The spleen was double its usual size, of the colour of wine lees, and easily penetrated. Pancreas healthy. The right kidney swam in water,

on account of the development of a considerable quantity of air beneath its proper coat. Its tissue was softer than that of the left side. The cortical substance of both was of a livid red colour for the depth of a line. Bladder quite healthy.

In the above case, we see that the dyspnœa, which was traced to very early life, had never been very considerable, and that the dilatation of the pulmonary vesicles was likewise not excessive, or, in other words, that there was a perfect correspondence between the one and the other. The oppression cannot be referred to dilatation or hypertrophy of the heart, no traces of which were to be found; or to habitual pulmonary catarrh, or dilatation of the bronchial tubes, which did not exist; or even to the tuberculous disease, the commencement of which was still recent at the time of the patient's death. By this method of exclusion, then, we are forced to account for the dyspnœa of Blanchon by means of the dilatation of the vesicles; and as this symptom was present from early life, we are forced, also, to date the commencement of the emphysema from the same period.

It is worthy of remark, that the oppression did not sensibly increase after an attack of pneumonia, which the patient experienced; for it shows that we cannot with certainty attribute emphysema to pneumonia, when the former makes its appearance soon after an attack of the latter. This caution is the more necessary, as it is not a very uncommon thing to meet with persons who have had two, three, four, six, or even a greater number of attacks of pneumonia, but who are, at the same time, free from shortness of breath, or any other symptom of pulmonary emphysema. Nevertheless, at first sight, and considering merely the anatomy of the parts, one would be disposed to form an entirely different opinion. In fact, when a lung, which is in the second stage of inflammation, is cut into, it presents an appearance of hepatisation, which is evidently owing to the accumulation of a more or less thick or concrete matter in the pulmonary vesicles. Under these circumstances the diameter of the latter is greater than usual, and one would imagine that this dilatation, which occurs in almost every case of pneumonia, (for it is almost always accompanied by more or less hepatisation,) would persist after the termination of the disease. But it is not so; for when the affection is dissipated, the cells resume their ordinary dimensions. Hence it is clear, from this as from a thousand other proofs, that nothing can supply the place of direct observations.

As to the correspondence which we have said existed between the symptoms and the lesions, it should be observed that, although the emphysema appeared to exist to about an equal extent on each side of the chest, the respiration was more feeble on the left than on the right; and that, on the contrary, there was on the latter a prominence which did not exist upon the opposite side. We may explain, to a certain extent, the greater strength of the respiratory murmur at the upper part of the right lung, by means of the excavation which was found at its summit, which, as it gave rise to



bronchial respiration, must also have altered the vesicular murmur. But how are we to account for the prominence, unless we suppose it to have been congenital, or admit an error of observation? The last would not appear very probable to any one who knew the gentleman who recorded the above case, and the time and attention which he devoted to the determination of facts.

Further, although emphysema was not proved to exist posteriorly on either side, it is yet very probable that the vesicles were dilated there; for the convexity of the chest, its extreme sonorousness, and the feebleness of respiration in that region, put the fact almost beyond question, at the same time that the engorgement would not allow of its being positively demonstrated.

It is scarcely necessary to observe, that there was a perfect accordance between the alterations of the venous system and the symptoms observed after the bleeding, and that death was owing, not to the emphysema, but to an accidental lesion.

2. *In the fatal cases*, the oppression of breathing was less minutely investigated, and, consequently, its history is less perfect than in the previous series. The following is a summary, however, of what was observed.

Difficulty of breathing was found in every case, but varying both in intensity and duration. In seven of the eighteen cases now before us, it existed from infancy. It commenced later in life in the others; before the twentieth year, at the ages of ten and eighteen, in three individuals, aged twenty-nine and fifty-five years; at twenty and thirty years old, in two cases; at from thirty-five to seventy-one, in the remainder.

In two out of thirteen cases where this matter was carefully examined, the amount of dyspnœa was always the same, or at least did not sensibly augment. One of those in whom it dated from the very earliest infancy, and whose history has just been given, was of this number. In the others, the dyspnœa augmented after the ages of thirty, forty, or fifty years, but commonly long before the period at which, in some instances, the first symptoms of disease of the heart made their appearance. It was not severe at the outset, except in one individual, a man of seventy-four years of age, and who died of cancer of the stomach.

*Paroxysms* of dyspnœa are noted as having been present in three cases, in two of whom difficulty of breathing had existed from early infancy. In a fourth case, it is mentioned that they did not occur at all, at least during the time that the patient was under observation (case 1).

§ II. *Configuration of the Chest*.—1. *In the patients who quitted the hospital more or less relieved*, the form of the chest was carefully examined in thirty-seven cases, and in every one it had undergone some change from the natural condition. This change was uniform throughout the whole chest in a young woman twenty-three years old, whose dyspnœa dated from early infancy, and had become paroxysmal about three months before her admission into the hospital. Her chest was every where more prominent

than in the natural condition, approaching to a globular form, and equally so in corresponding points. This prominence was formed both by the ribs and the intercostal spaces, which latter were not depressed as they are in the natural condition, especially in thin persons. In the other cases, the change of form was similar in character, but partial in extent, the prominence being limited to one side of the chest, except in three cases, where two prominences were observed, whose surfaces were irregular, the one being on the right side and the other on the left, and not precisely in corresponding points.

The prominence alluded to, commonly commenced under one or other clavicle, and extended downwards to near the mamma, or even a little beyond in some cases, its breadth being three or four inches. It was impossible, with a little attention, to have mistaken this prominence, when it was well marked, for an original defective organisation, since both the ribs and the intercostal spaces contributed equally to form it. It was likewise impossible to have attributed it to a pleuritic effusion, because the dilatation of the chest, which sometimes accompanies the latter, is general, and also more marked below than above. It could not, moreover, have been confounded with that which results from a collection of liquids, except when it existed over the præcordial region, and was limited to it, which occurred in three cases, and in which it might have been asked whether it was not owing to an effusion into the pericardium. But the absence of the other symptoms of pericarditis did not allow us to remain very long in error upon this point. The prominence which is consequent upon an aneurism of the aorta is generally more circumscribed and better marked; so that the observation merely of the prominence which we have described, of its form and extent, has pointed out to us almost certainly the existence of an affection of the chest, which was neither phthisis, nor dilatation of the bronchia, nor pleurisy, nor aneurism of the aorta, nor even a pericarditis (I except the few cases in which there might, at first, be some doubt upon the subject). The dyspnœa, too, having been present for a certain length of time in these cases, and with the characters noted in the preceding paragraph, we are obliged to consider them as so many examples of emphysema of the lungs.

Three times only out of six cases, where the back was examined, was a prominence, similar to that which has been described, found posteriorly. The preference which this elevation appears to have for the anterior part of the chest, is in accordance with what we have already stated as regards the lungs, viz., that their free border and the neighbouring parts were the principal seat of emphysema, and the point where the latter was most developed.

Further, the prominence we have been speaking of was not equally frequent on both sides; it occurred eleven times only on the right, and twenty-three times on the left. Notwithstanding that the numbers are small, it is not easy to suppose that the above difference is altogether accidental, since we arrive at a similar

result, or thereabouts, by consulting separately the cases recorded by Jackson and myself. In fact, the proportion of the elevations on the left side to those on the right, is 15.7 for the one, and 8.5 for the other.

This result, however, is, to a certain extent, in opposition to one which was announced in the chapter on pathological anatomy—viz. that both the amount and frequency of emphysema appeared to be the same in each lung. But may it not be that the unequal frequency of the elevations on the left and right side, among the patients of the first series, was temporary, and that it disappeared in proportion as the disease became more advanced? By this supposition, the above contradiction would only be apparent, and opposite results would be harmonised. But it is merely a supposition, and experience must determine the question.

In emphysema, there is also found another prominence, different from the one above described, and which I have lately observed, occurring in a different part of the chest, behind the clavicles. This elevation existed in every case where it was looked for, with one exception, which presented itself in a thin man aged forty-three years, and in whom the supra-clavicular regions were both hollow, although there can be no doubt of the existence of emphysema in his case, there being a slight prominence anteriorly on one side.

This last mentioned elevation, the presence of which might have been readily inferred from that of the other, was mostly confined to one side, or that upon which the first existed. The only exceptions to this were found in four cases, where the emphysema was remarkably developed, and where both supra-clavicular regions were manifestly less depressed, or more prominent, than in the natural state, though in different degrees. The elevation now alluded to was especially observable in old men, in whom the side of the neck corresponding to it, in cases where the change of form was considerable, appeared, if we except the flaccidity of the integuments, like that of a young man; presenting a convexity superiorly, whilst on the opposite side there was a more or less decided depression.

This double elevation, which is found only in emphysema, has enabled me to recognise this affection in more than one case, where subsequent examinations have confirmed the first diagnosis.

2. *In those who died*, the form of the chest was attended to, and in every one it was found to have suffered some change anteriorly. In seven, the prominence was simple—*i. e.* limited to one side. It was present both at right and left in the eighth part of the cases, and at different points.

Three times out of seven it was remarked on the left side—a result the inverse of what was found in those who left the hospital more or less relieved, and which is to be accounted for, no doubt, by the smallness of the numbers; for in the patients of the present series, when regarded anatomically, and in greater number, both lungs appeared to be equally affected, or thereabouts. Further, in the class of cases now under examination, the greatest development



of the emphysema corresponded to the prominence, or prominences, indicated; so that it is impossible to have any doubt as regards their importance, or the cause producing them, in the disease before us.

As for the supra-clavicular regions, they were more prominent on one side than the other in the three cases where they were described, and, as in the patients of the preceding series, this elevation was found on the same side as that which had its seat on the anterior portion of the chest, or on the side where the emphysema was most marked.

The following case is so remarkable an example of the connection which exists between the greatest degree of emphysema and the elevation of the chest in the same individual, that I shall introduce it here.

#### CASE III.

Frequent cough from infancy, dyspnœa augmented within the last fifteen years: during the latter period, constant cough and expectoration; palpitations at intervals for the last six years; several attacks of apoplexy during the last four, &c., &c.—Lungs prominent, their vesicles dilated—Heart hypertrophied and dilated—Partial softening of the brain—Marks of hemorrhages in the right hemisphere, &c.

A gilder of metals, aged 77 years, with a constitution originally strong, hair gray, and eyes blue, was admitted into La Pitié the 16th of April, 1832, and carefully examined upon the 29th of December and 26th of January following. Regular in his conduct, having had, at the ages of 22 and 40, respectively, a mercurial tremor; he worked but little in mercury during the interval between these periods. During two consecutive years, his 72d and 73d, dysury, passage of gravel, and even small calculi, by the urethra, after which the urine passed freely. Three days after the revolution of July, attack of apoplexy, with hemiplegia of left side. In less than six weeks afterwards the hemiplegia disappeared almost entirely, but still the side affected was never entirely restored to its natural condition. In March, 1832, there was a fresh attack on the same side, which necessitated a residence of only a week at La Charité. However, at the time of his entrance into La Pitié, the patient could not walk, and it was not till some time afterwards that he began to support himself upon his limbs. From his infancy he had been subject to short breath, and to frequent colds during winter; for the last fifteen years constant cough and expectoration, respiration more difficult than before; for the last eight or ten years has been obliged to recline with his head elevated, has had *paroxysms* of dyspnœa, and during the last five or six years has experienced occasional palpitations, which were slight, however, except after a fit of coughing or violent exercise. For the rest, he never had œdema of the lower limbs or swelling of the belly; has had no pains in his chest, except about two years ago on the left side, accompanied with bloody expectoration and fever, for which he was bled several times.

27th of December. Cough and dyspnœa moderate; percussion of the chest sonorous anteriorly, except over the præcordial region, in

a very limited space, more so behind on the right side, in the inferior half, than at left. In the lower half of the right side posteriorly the respiration is feeble, and mixed with sonorous râle; whilst in the left it is, on the contrary, rather stronger. Impulse pretty strong at the præcordial region; pulse regular, 72; a little stronger at right than left; skin cool; marked debility of the left limbs, the lower one of which drags, but is not appreciably thinner than that of the opposite side. Commissure of lips deviate a little to right side; appetite good, digestive functions natural. The patient remains almost constantly sitting near his bed, without quitting the ward.

Along with the cold weather in the first part of January, the expectoration increased, the dyspnœa remaining the same; debility more marked.

28th. After a chill which took place last evening, tongue whitish, thirst, appetite less; pulse 84; oppression of breathing increased; expectoration demi-opaque, with some streaks of blood; chest contracted and flattened at left, except in a very circumscribed space, a half an inch beneath the clavicle, where there is a prominence. On the right side the thorax appears convex, and presents near the sternum, from the third to the fifth ribs inclusive, a prominence about two inches in breadth, as well marked as the one above mentioned. The percussion is more sonorous anteriorly, even in the præcordial region, than natural; is not decidedly more so at right than at left, but is greater over the elevations spoken of than elsewhere, and especially over that which is situated on the right side. The respiratory murmur is very feeble anteriorly opposite the prominences mentioned, especially opposite the right one, where in fact it is scarcely heard, and in the lower half of each side. Behind, where it is not easy to institute an examination on account of the weakness of the patient, the pulmonary expansion is feeble on both sides, in the upper half; beneath is heard a subcrepitant râle in the midst of a feeble respiratory murmur. The impulsion of the heart is constantly strong, and is felt under the left clavicle.

29th. Pulse 120, very irregular, strong at intervals, then extremely feeble and difficult to be felt; pains beneath the left mamma, augmented by percussion, which the patient has felt occasionally for two years past, and attributed by him to a blow received at that time in the præcordial region. The impulsion in this point, the conformation of the chest, the respiration and the râle, the same as last evening; countenance more pale, appetite less, sweat at night as on the 28th.

On the 30th, the condition of the patient had not materially changed. He was bled from the arm eight ounces on the 31st, and from the 2d to the 10th of February, the day of his death, he was in the following condition.

The oppression was always considerable, especially in the evening; the respiration in the morning being 36, and in the evening 40 in the minute. A sonorous râle was always found at the anterior part of the chest, and on the 2d there was still heard at the



posterior inferior portion of the right side, a subcrepitant rhoncus. On the 9th the expectoration was opaque and a little streaked with blood.

The pulse was very variable, both as it regards its frequency and rhythm, so that on the 3d it was 100 and regular, on the 4th 86, the 5th 76, the 6th 144 and very regular, the 7th 84 and regular, as previous to the 6th, the 8th 133, small and irregular, the 9th 84 and regular, the 10th 120, very small and very irregular.

On the 2d, the right pupil was twice as large as the left one; the sight nevertheless being equally good on both sides. On the 8th, frontal pain at right; the 10th, at one o'clock in the afternoon, it exists also slightly at left, but is not exactly limited. Countenance approaching a violet colour, features sunk, whole body cool, the memory and the other intellectual faculties in good condition; the dilatation of the right pupil continues; the left arm, which has become gradually more feeble, and has been the seat of prickly sensations for the last five days, is immovable, and the fingers of the corresponding hand can scarcely execute a few slight movements; those of the leg are free, although feeble, and this limb, like the forearm of the same side, is a little infiltrated.

On the 7th the patient still took a little soup, urination began to be difficult, and continued so afterwards; the thirst was variable; no nausea or vomiting.

Death took place at 5 o'clock in the evening, three hours after the last interrogatory.

The patient was bled a second time on the 9th, without any evident melioration, and his blood, which coagulated feebly, was covered with a red crust of no great thickness.

*Autopsy thirty-nine hours after death. Exterior condition.*—Same infiltration as during life; some black spots upon the right haunch, not penetrating more than half way into the thickness of the skin; no stiffness of the limbs.

*Head.*—A small quantity of blood on the external surface of the dura mater, in which is an ossification near the falx, of about an inch in length by three lines in breadth. Considerable infiltration under the arachnoid, especially behind; arachnoid opaque and thickened as well as the pia mater. Hemispheres of the brain apparently smaller than common, but perfectly equal. Cortical substance very pale; white substance but little injected, of good consistence. An ounce of clear serum in each lateral ventricle; right corpus striatum a little larger and less consistent than the left; vessels on its surface far better marked than those on the latter. Pretty close adhesions between the right corpus striatum and the demi-transparent septum, situated about a line below the corpus callosum, and extending for an inch in length by two lines in breadth; septum lucidum thicker and firmer there than elsewhere, also a little yellow. In the interior of the right optic thalamus, about six lines from the tubercula quadrigemina, and seven from the corresponding ventricles, was a small cavity nine lines in length by two in breadth and about one in height. This cavity was

empty, and lined by a thin yellow false membrane, giving rise on its internal surface to little filaments which might be seen floating about when immersed in water. Two or three lines behind this cavity was found another, much smaller, but otherwise similar to it, whilst a little more to the right was observed a third one, very small, of the size of a little pea, containing coagulated blood, and lined by a thinner and more polished membrane than that of the others. Around these cavities, for a short distance, the cortical substance is a little less firm and less white than elsewhere. In the left lobe of the cerebellum, posterior to and partly in the corpus rhomboideum, was also found a small cavity, almost effaced, four lines in length and a little less than one in breadth, lined by a membrane similar to that which has been described, of a brownish and grayish colour, and tolerably firm. The tissue surrounding it, like the rest of the cerebellum and the annular protuberance, appears in the natural condition.

*Neck.*—Epiglottis and larynx perfectly healthy; some pretty viscid mucus in the trachea, the mucous membrane of which, of a light red, is of the natural consistence and colour.

*Chest.*—Right lung large, not collapsed, extending beyond the median line to the left, especially in the middle portion; of a pale gray, presenting some slight adhesions laterally and between its lobes, which are four in number (the fourth is almost triangular, very small, and behind the middle one). Its free border is less sharp than common, its vesicles every where dilated, but unequally, more so at the base and along the free border than elsewhere, the largest being about the size of a pin's head. At the summit, for four or five inches in extent, the pulmonary parenchyma contains a red, abundant, spumous liquid; elsewhere it is pale, and has but little blood. The bronchial tubes of the lower lobe are red, evidently thickened, less transparent than usual, and contain a great deal of mucus. Those of the upper lobe are perfectly healthy, except only a single one, which is obliterated at three quarters of an inch from the surface of the lung, and has around it, at that part, an irregularly rounded, hard, white mass of the size of a pea, which creaks under the scalpel. The left lung is small, does not pass beyond the part where the cartilages and ribs unite, and adheres throughout its whole extent to the costal pleura, by means of a false membrane a line in thickness, and infiltrated with a yellowish serum. Its vesicles are every where dilated, although less so than those of the right lung, except at the summit, where they are as big as the head of a large pin. Its parenchyma, like that of the right, contains a considerable quantity of red spumous liquid, without induration. The upper bronchial tubes are a little thickened, and contain a considerable quantity of mucus; no effusion of liquid into the corresponding pleura; an ounce of limpid serum in the pericardium. Heart large; its left ventricle is almost as broad at top as bottom, is four inches long by four and a half broad, and has walls nine lines thick in the middle. Towards its point it presents internally a sort of cul-de-sac, the walls of which are thinner than those of the sur-

rounding parts. The fleshy fibres of this cul-de-sac are of a reddish brown, both upon the internal and external surface; and between these two layers is found another of a yellowish colour like the aorta, evidently softened in the centre. In this cul-de-sac, also, the internal membrane is not found, and at its circumference the fleshy columns are half broken. Further, there was found, in the whole anterior portion of the ventricle, a yellow layer more consistent than the healthy parts of the heart, without any distinct fibres, a little softened, and not greasing paper. The mitral valve presents, for twenty lines in length, an elevated border, three lines thick. The right ventricle is a line and a half thick at the middle portion; nothing remarkable observed. The aorta is three inches in circumference at its origin, and is studded with numerous yellow spots and ossifications throughout its whole extent. The circumference of the pulmonary artery at its origin is only thirty-four lines. The posterior and anterior tibial arteries of both sides are ossified, and completely obliterated about the middle of their course.

*Abdomen.*—Pharynx in a natural condition. Epithelium of the œsophagus a little thicker and more easily raised than in the healthy state. Stomach tolerably large, containing a small quantity of mucus partly tinged with blood. Its mucous membrane a little injected in the great cul-de-sac and on the posterior face, of a very decided gray slate colour along the large curvature as well as the anterior face and near the pylorus, mamelonated wherever this gray colour is found. The membrane is of good consistence every where except along the great curvature, where strips of only four or five lines long can be raised; thickened in the great cul-de-sac and along the anterior face, where it is three or four times as thick as on the posterior face. The duodenum was a little red on its internal surface, without other material alteration. The small intestine was larger than natural, contained a fluid more or less thin, which was alternately brownish or yellowish, of the colour of wine lees in the two last feet. Being somewhat injected in the upper half, especially in the cellular tissue, it was of a pretty deep red near the cœcum for about two feet in length; in which latter part the mucous membrane, which was of the same colour, was a little thickened, and could only be raised in strips of from one to three lines in length, whilst in the neighbouring parts these were from three to four, and, still higher up, from four to six lines long. Some crypts of Brunner were visible in the two last feet; the mesenteric glands were small and healthy. The large intestine contained substances the consistence of which gradually increased as you went towards the rectum, where they were moulded although still soft. Its mucous membrane was pale and of good consistence and thickness, except for about three inches in the transverse colon, where it was red, and gave strips of only four or five lines. Crypts of Brunner few and but little developed. Liver a little pale, otherwise healthy. The gall-bladder presented nothing peculiar, except five or six concretions of from four to six lines in diameter, yellow,



of a mamelonated aspect, and composed in a great measure of a yellow crystalised substance. Spleen of good size, covered with an envelope partly cartilaginous and irregular on the surface. Kidneys of natural size; their external surface after the removal of their coat was crimped as it were; their vessels a little larger than common; small serous cysts were found at their surface, particularly on the left side, where were also observed, situated in the pelvis of the organ, a very large number of yellow gravel stones of the size of a pin's head and smaller. Similar ones were found in the bladder, and a small stone, six lines in length, three in breadth, and about half as thick, occupied the canal of the urethra. The bladder was small and perfectly healthy. Two hernial sacs were found extending from one end to the other of the scrotum, but containing no intestine; and in the septum which separates the testicles was observed a tumour five inches long by two broad, and about two and a half in thickness, whitish, hard, its cut surface shining, creaking under the scalpel, whilst in the midst of it were to be seen several little pockets filled with serum.

In accordance with what was stated in the general description of the disease, the right lung in the preceding case was free from adhesions, did not collapse, but was of large volume; its free border being rounded and extending a little beyond the median line. A similar condition of parts could not exist on the left side on account of the universal adhesions; but on both sides the dilatation of the vesicles was general, and we wish especially to call attention to the fact, that the maximum of dilatation corresponded to the two prominences on each side; so that no doubt can now exist as regards the importance of the latter, and their cause.

In this, too, as in many other cases, the dyspnœa was traced to infancy, but had remained stationary for a considerable length of time, not being augmented in fact until a pretty advanced age, viz. sixty-two years. *Paroxysms* of difficulty of breathing showed themselves only during the last eight or ten years; and on account of the enlargement and other lesions of the heart which were found, but which I cannot now stop to consider, the reader will perhaps ask whether they were not the real cause of the dyspnœa in the case before us. Without doubt they increased it during the latter part of the patient's life; but as we cannot suppose it to have been present previous to the occurrence of palpitation, we must conclude that nothing which occurred previous to the last six years can be attributed to disease of the heart, and that the dyspnœa which had existed from infancy, as well as the paroxysms of it in after life, must be attributed to the pulmonary emphysema.

It is also worthy of observation that although the bronchial tubes were dilated, their dilatation was partial, and no way proportionate to that of the vesicles, which was universal. Notwithstanding, too, the long duration of the catarrh, there was not the smallest trace of tubercles or gray semi-transparent granulations in the lungs. These two facts, however, are not at all surprising, as they are in accordance with a general law; but it is truly astonishing to find a man



arrived at the age of seventy-seven years who had had dyspnœa from infancy, and who, in the last five or six years of his life, had been attacked with pleurisy, organic affection of the heart, several cerebral hemorrhages, and gravel. What strength of resistance in the vital power!—what perseverance and length of time, too, it must have required to obtain from a patient, intelligent to be sure, but still one that was weak and suffering, all the details which the author of the case has left us, and which are all so well explained by the lesions afterwards found, and whose occurrence was foreseen! To what results may not observation pursued in this manner lead?

It is no doubt owing to the difficulty of examining the chest consequent upon the debility of the patient, that we must attribute the indecision of the author in relation to the relative sonority of the two sides of the chest. The sound on the left side ought to have been less than on the right, since the former was contracted, and the dilatation of the cells of the corresponding lung was a little less than on the opposite side.

As regards the two forms of prominence which we have been considering, I will observe that the greater their importance in reference to the diagnosis of emphysema, the greater should be the care exercised in determining their existence in individual cases, in order to avoid the mistakes into which we might fall in this respect. For this purpose, if we wish to determine the form of the chest anteriorly, the patient being in bed, he should lie upon his back and be inclined to neither side; without which latter precaution the anterior part of the chest might appear prominent when it was not really so. If on the contrary we wish to determine the form of the supra-clavicular region, the patient should sit upright, without bending to either side, the arms hanging down along the side or crossed in the same position; and if the difference between the two regions is not evident, the patient must stand up out of bed, taking care not to support himself on one hip, and with his arms placed as before mentioned. In fact it would be proper in every case, to place the patient in this position, in order to determine more accurately the various alterations of form which the chest may present.

§. III. *Of the Sonority of the Chest.*—1. *In the patients who left the hospital more or less relieved*, the percussion of the chest was more sonorous than natural, as has been previously mentioned, over a surface variable in extent, and sometimes over the whole chest, in cases where there was no tuberculous complication. But one exception occurred to this rule, in the case of a corpulent man of short stature and broad make, thirty-seven years of age, with a well-developed muscular system, whose chest gave but little sound throughout, in consequence, no doubt, of the great thickness of the soft parts; for in this patient, who had experienced for more than twenty years all the rational symptoms of emphysema, and who had not felt those of any other affection, except a little œdema at intervals for the last three or four years; in this patient, I repeat that

we cannot suppose the affection to have been limited to the internal surface or base of the lungs, a condition of parts which I once observed in this disease, and when percussion was of no service in the diagnosis; since the respiratory murmur was feeble throughout, and accompanied and often even masked by a whistling sound of which we shall speak in the next paragraph.

But in almost every case where the sonoriety of the chest was augmented, this augmentation was neither uniform, nor similar at corresponding points on each side, and it was at its maximum in those parts where the prominences were found. Owing to a negligence which I very much regret, and which I mention in order that others may avoid it, I almost always omitted to examine the form of the back. Eight times, however, I found excessive sonorousness behind, either at right or left, on the same side on which a prominence was found anteriorly; in which cases, perhaps, there was also one behind where the percussion was most sonorous.

The simultaneous existence, in one portion of the chest, of a prominence and a degree of sonorousness greater than that of the surrounding parts, showed, independently of any other symptoms, that the prominence was not owing to an effusion of liquid, nor, when it existed at the præcordial region, to enlargement of the heart, but to the presence of air accumulated in the part to an extent beyond what is natural. The next question to be determined was whether the air was still contained in the lungs, or was effused into the cavity of the pleura. An effusion of air could not take place except through the medium of a perforation of the pulmonary tissue; and the symptoms of this perforation, which are connected almost exclusively with phthisis, not having taken place, we might, by means of this negative fact and independently of auscultation, arrive at the conclusion that the prominence and excessive sonorousness were owing to a considerable dilatation of the pulmonary vesicles. But the emphysema is never limited to the elevated portion of the chest; so that the simultaneous existence in one part, of these two symptoms, viz. an elevation and excessive sonorousness, point out with almost positive certainty, and independently of other signs, the existence of a more or less considerable and extensive emphysema of the lungs.

2. *In the patients who died*, the same excessive sonorousness existed in analogous points, that is, in those which were the most prominent and corresponded to that part of the lung where the vesicles were most dilated and contained the largest proportion of air. (Case 3.)

§ IV. *Respiratory Murmur, Ronchi*.—1. *In the patients who left the hospital more or less relieved*, the respiratory murmur was feebler than natural, either throughout the whole chest, which was rather uncommon, or in one portion only. No where, however, was it so feeble as under the elevation so often spoken of, with one exception, which it will be easy to account for after reading the account of the fourth case. This diminution of the respiratory murmur was the more remarkable in five cases, inasmuch as it was

confined almost entirely anteriorly to the part of the chest which was elevated, and to the corresponding portion behind. On this account it could be attributed only to the dilatation of the air-cells, that is, to the emphysema.

This feebleness of the murmur remained the same, or nearly so, during the whole time that the patients remained in the hospital; if we except one case where this symptom diminished very much without entirely disappearing. In four cases, also, the respiratory murmur, without seeming decidedly feebler than natural opposite to the prominences, was a little hard, and as if it were produced by the air entering into cells which were smaller than those on the opposite side, where the respiration seemed finer and softer. These sensations, which perhaps will appear obscure on account of the difficulty of finding terms by which to define them properly, these sensations, I repeat, were nevertheless very well marked and easily appreciated. Several times within the last two years, and since the facts which I am analysing were recorded, I have had the opportunity of again observing them in analogous cases, in the presence of other individuals. How shall we account for them? As the condition of the lungs could not be determined by a post mortem examination, perhaps it will be said that there was in these cases a greater or less dilatation of the bronchial tubes. But this supposition cannot be admitted, because broncophony was absent in every case; and on this account it is extremely probable that the roughness of the respiratory murmur depended both upon the hypertrophy and dilatation of the pulmonary vesicles. These, too, being less numerous in the part alluded to than in the corresponding portion of the opposite side, would make the murmur seem more scanty than natural. However, this view of the subject cannot be regarded as correct, until it shall be verified by a greater number of facts.

Although the feebleness of the respiratory murmur was generally proportionate to the duration of the disease, it is also true that there were some remarkable exceptions to the rule, especially in the cases of three individuals, whose ages were severally eighteen, thirty, and forty-eight, who had laboured under the symptoms of emphysema only for two and a half years, and in whom, nevertheless, the respiratory murmur was more feeble opposite the prominences, than it was in the same part in other patients who had been subject to the same symptoms for more than ten years. This fact might have been deduced from that previously established, viz., that emphysema is sometimes slight in patients who have died when upwards of sixty years of age, and who have been subject from infancy to a greater or less degree of dyspnœa.

Besides this feebleness of the respiratory murmur, one or two species of râle were heard in every case. The one, the sibilant and sometimes sonorous râle, was found in thirteen of the thirty-one cases which were examined with sufficient care in reference to this point. This râle existed in various degrees, was more marked at the time the patients entered the hospital than when they left it, and most commonly was nearly universal. In four cases, how-



ever, it was limited to the prominent portion of the chest, or in other words to that part of the lungs where the dilatation of the air-cells was the greatest. It would thus seem that this râle, although it may be found in other diseases, is perhaps especially connected with emphysema.

In four cases there co-existed with the above râle another sound of a very different character, I mean the subcrepitant râle, which was found also in eighteen other cases, and in both was situated behind and inferiorly, and mostly on both sides at the same time. I have observed but one exception to this rule, and that was in the case of a patient in whom the subcrepitant râle occupied the whole height of the chest posteriorly, and merely a small portion of the same side in front under the clavicle. This exception, however, was more apparent than real, because the râle had still commenced at the base of the chest, and had not arrived at the summit until after the lapse of several days, and besides, its disappearance first commenced at the latter point. We may add, that in no case did this râle exist at the anterior part of the chest, opposite to the prominence. This absence of the subcrepitant râle opposite that portion of the lungs where the emphysema was most developed, does not prove that it cannot exist where there is a certain degree of dilatation of the vesicles, especially as in several cases where this râle was present posteriorly, there was certainly at the same time a greater or less dilatation of the cells in the same part. But the majority of those who came to the hospital with the symptoms of emphysema, had been labouring for some days previous under an acute pulmonary catarrh, which had very much augmented their habitual dyspnœa. Now, subcrepitant râle is one of the most common symptoms of acute pulmonary catarrh, and when it is so, it is uniformly, and without exception, found (according to my observation, and I have latterly tested its correctness in a hundred cases) at the posterior inferior portion of the chest and commonly on both sides. This remark holds good, not only where the pulmonary catarrh is simple, but also where it occurs as a complication in another disease, as typhoid fever; and even, too, where there is something specific in its character, as in measles. It is not astonishing, then, that the seat of the subcrepitant râle should still be the same in the cases before us. This law of its development is further important, inasmuch as it seems to indicate that emphysema, the maximum of which is usually found near the free border of the lungs, is independent of pulmonary catarrh, at least when of an acute character. Besides, it augments the number of facts, already very considerable, which show the complete distinction which exists between catarrh and tubercles.

However, this subcrepitant râle does not appear to me to differ from that which has been mentioned by the illustrious author of auscultation, as pathognomonic of emphysema of the lungs; and the reader, finding before him two such contrary assertions, will no doubt enquire which is true. But his hesitation will quickly vanish, and he will repel the assertion of Laennec, provided he does not lose



sight of the facts above mentioned,—that the subcrepitant râle of emphysema was the same, followed the same laws, and was found in the same parts, as that which is connected with acute and severe pulmonary catarrh; and that it was not heard in those portions of the chest which corresponded to the maximum of the emphysema. It is, moreover, to be regretted that Laennec has not pointed out the parts of the chest where he observed this râle, which is noted in only one of his cases and that vaguely; for no doubt they were the same as those in which I observed it, and the conclusion from the facts which I have brought forward would probably have appeared more evident. How great the precision, then, and how numerous the details, which it is necessary to introduce into the histories of particular cases in order to avoid error, and arrive at a knowledge of the laws of our economy!

2. *In twelve of the patients who died*, who were ausculted and in other respects carefully examined, the respiratory murmur was very feeble, and especially at that part of the chest where there was a prominence, and where the maximum of dilatation of the air-cells existed.

In one case, where the form of the chest was not described, (case 1), the respiratory murmur was absent, or nearly so; and in several parts there was heard, during inspiration, only a more or less prolonged whistling sound. The reader will no doubt recollect that this case was one of all others in which the dilatation of the cells was carried to its greatest height. We cannot doubt then that the prominence of the chest, its excessive sonorousness in the same part, as well as the feebleness of the respiratory murmur, are connected with an anormal and more or less marked dilatation of the pulmonary vesicles.

The following case appears to be an exception to this law; but the exception is only apparent, and is explained by the disposition of the parts.

#### CASE IV.

Cough and oppression for more than four years—A prominence upon the anterior and posterior portion of the left side of the chest; sonoriety greater than common on both sides in different points; diminution of the respiratory murmur in some parts—Lungs rounded at their free border, not sunken; their cells universally and unequally dilated—Some of the bronchia a little thickened, without dilatation.

A seller of lemonade, aged seventy-two years, with but moderate intelligence and a poor memory, was admitted into the hospital of La Pitié the 18th of January, 1833. When questioned at several different times, from the 19th to the 25th, he always replied that he had coughed and been subject to oppression ever since the revolution of July, that he had experienced some dyspnœa anterior to this epoch, but not so far back as infancy, and that he could not recollect accurately the time of its commencement. He added that he was subject to palpitation, and that he had never spit blood or had any swelling in his lower limbs. At several different times, also, during the same period, from the 19th to the 25th, there was

found a subcrepitant râle at the posterior portion of the chest on both sides. On the 25th a very attentive examination of the chest and of the state of the respiration enabled us to determine the following points. On the left side, under the clavicle and posteriorly, opposite the angle of the ribs, there were prominences which did not exist on the right; percussion throughout very sonorous, a little more so for an inch beneath the left clavicle than at the corresponding part on the right side; beneath this point, on the contrary, it was more sonorous at right than left, whilst posteriorly it was the reverse; between the left nipple and the median line, for the length of about two inches, there was a little less sound than elsewhere. On the right side, the respiratory murmur was less feeble under the clavicle than on the left; below, all around, for two or three inches in height, it was more feeble than above. On the left side the feebleness of the respiratory murmur increased as you descended from the clavicle to the nipple, an inch beneath which it was not heard. It was very feeble under the arm-pit and in the upper three inches behind, more so even than at right, and beneath it was not heard at all. There was no sound on expiration, or resonance of the voice in any part. A little subcrepitant râle behind at the lower part of the right side, and a little sibilus above. On the left side there was a universal subcrepitant râle, but much less numerous anteriorly than posteriorly. Impulse of the heart strong; its pulsations heard throughout the whole chest. Dyspnœa considerable; head very much elevated.

From the 25th to the 29th, no appreciable change. On the 29th, the signs from auscultation and percussion were the same as on the 25th; dyspnœa constantly great; respiration thirty-six; cough very frequent, causing pain on the right side; the expectoration scanty, there being in the spitting-cup but one sputum, which was greenish, opaque, and not aerated; pulse 130; deglutition easy; tongue violet coloured and moist; no thirst; appetite moderate; tendency to stupor. Patient has lost flesh decidedly since entering the hospital, without having had diarrhœa.

On the 31st, at four o'clock in the evening, cough exceedingly frequent; respiration thirty-six; pulse 110, very irregular.

1st February, nearly at the same hour, dyspnœa is a little less; respiration only twenty-four; expectorated matter, consisting almost entirely of frothy saliva, in the midst of which are some greenish masses, opaque and not aerated; pulse 108.

2d, at ten o'clock in the morning, countenance of a livid red; heat augmented; crepitant and subcrepitant râles posteriorly and inferiorly on both sides. (v. s. 3x.)

In the evening, orthopnœa; respiration forty-eight; speech interrupted and almost impossible; two or three demi-transparent expectorated masses, a little rusty and viscous; countenance violet coloured, pale, and livid; pulse 144; tongue clean, moist, violet coloured; one natural stool; answers correct; abdomen free of pain. Some hours afterwards the patient was bled, but without

relief, and died about eleven o'clock in the evening. The blood was not covered with a crust.

The examination of the chest, repeated several times after the 25th of January, always gave the same results.

*Examination of the body thirty-six hours after death. Exterior condition.*—Paleness, without lividity; slight stiffness of the limbs; second stage of emaciation.

*Head.*—Some drops of blood on the external surface of the dura mater; glands of Pachioni pretty well developed, chiefly behind; slight infiltration under the arachnoid; scarcely a small spoonful of clear serum in each lateral ventricle; a slight lilac shade in some parts of the white substance. Nothing else worth observing in the whole brain.

*Neck.*—The pharynx, epiglottis, and larynx, are in a natural condition; trachea red, its sub-mucous cellular tissue injected, its mucous membrane otherwise perfectly healthy.

*Chest.*—The pleuræ contain no serum. The lungs pass the median line; the right one has some cellular adhesions in its two upper thirds, except anteriorly and in the fissures; its size is considerable; it does not sink on opening the chest, and at its summit it is overlapped by the left lung, for about an inch. It is light, soft, and pale, except inferiorly and posteriorly, where it is a little heavy, non-elastic, and of a violet red in its lower half. Its free border is rounded, turgid as it were; its middle lobe overlaps by half an inch the summit of the inferior, which is twice as large as the corresponding one on the left side. Its cells are dilated throughout its whole extent, a little less at the summit than elsewhere, the dilatation becoming greater from behind forward, and the more so as you approach the free border. The dilatation is greater along the lower border and inferior surface of the middle lobe than in any part of the superior lobe; it is still more so along the anterior and sharp edge of the inferior lobe, which at this point is eight or ten lines thicker than natural, and demi-transparent—the vesicles in the same part being twelve or fifteen times their usual size. The dilatation continues to be apparent until you reach that part where the engorgement above mentioned exists. The parenchyma of the superior lobe contains only a small quantity of a pale and spumous liquid. A part of the middle and almost the whole of the inferior lobe contain a greater quantity of liquid, which is red and almost throughout spumous. A portion of this lobe, about an inch and a half in extent, has a granulated aspect, is of a deeper red than the surrounding parts, contains but little blood, is destitute of air, and sinks to the bottom in water. The bronchial tubes contain a greater amount of mucus the lower you descend; they are no where enlarged, and seem merely to be a little thicker in the middle and inferior lobes than natural. The left lung is heavier than the right; has adhesions between its lobes, and at the inferior part of the upper one, posteriorly and laterally. Its two lobes are violet coloured behind and on the sides; their free border is more rounded than natural; that of the upper lobe is more so than the corresponding



one at right, the reverse of which is true of the inferior one. The dilatation of the vesicles, which is universal wherever they can be distinguished, is greater in the upper lobe than in the analogous one at right, and in some points two or three times greater; the reverse of which is true here also of the inferior lobe. The bronchial tubes contain a great deal of mucus; those of the upper lobe present nothing remarkable, except at the narrow border, where they are manifestly a little thickened, without being dilated; the same is true of those near the internal face of the lower lobe. The others present nothing unnatural, except a little redness in those parts where the surrounding tissue is red; the two lower thirds of the upper lobe are hepatised laterally and posteriorly, to the depth of about ten or twelve lines. In front, the pulmonary parenchyma is not granulated, swims on water, and contains a spumous liquid. Same red hepatisation of the lower lobe, but over a smaller extent. The pericardium contains an ounce of clear serum. The heart is of good volume, firmness, and colour, and has a small white spot on its surface. The walls of the left ventricle are four lines and a half thick at the summit, and five lines elsewhere; those of the right ventricle a line and a half and two lines at the same parts. A part of the internal membrane of the left cavities is slightly opaque, whitish, and thickened. The semi-lunar valves of the aorta are three times their usual thickness, whitish, and less flexible than usual; the aorta is thirty-three lines in circumference—the pulmonary artery thirty-six.

*Abdomen.*—A scrotal hernia on the right side contains a fold of the small intestine. Stomach pretty large, containing five or six ounces of a greenish and yellowish liquid. Its internal surface is grayish, except in a small portion of the great cul-de-sac, where there is a slight injection. Its mucous membrane is elevated, both in this portion and on its posterior face, by very turgid veins; it is of the usual thickness throughout its whole extent; gives strips of from two to four lines in the great cul-de-sac, from six to eight on the anterior and posterior surfaces, from eight to ten along the small curvature, and is no where mameloned. Nothing remarkable in the duodenum. The small intestine is of the usual size, and contains in its upper half a moderate quantity of yellowish fluid, which becomes brownish and greenish towards the termination of the ileum, where it is of a pultaceous consistence. Its mucous membrane is pale and of the natural consistence throughout its whole extent; gives strips of three to four lines in length in its upper half, and of eight to ten in the remainder. No glands of Brunner. The large intestine contains fæcal matters, the consistence of which becomes greater as you go from the cæcum to the rectum, where they are abundant and moulded in form. Its mucous membrane is pale, of good thickness, gives strips of from two to four lines in the cæcum, from eight to ten in the transverse colon, from twelve to sixteen in the remainder. The glands of Brunner are pale, small, and numerous. The liver contains a little more blood, and is a little less cohesive than natural, without any other appreciable



alteration. The gall-bladder contains a yellowish liquid, which runs pretty freely, and is in small quantity. The spleen is two inches and a half long, by one and a half broad, and one in thickness; it is covered with a cartilaginous membrane over nearly its whole surface, smooth externally, rough internally, its maximum thickness being one line; four fifths of the organ consists of a liquid substance, of the colour of wine-lees, deposited in the midst of a reticulated tissue, which is flabby and not easily torn: the remainder is of a normal consistence. The external surface of the kidneys, when deprived of their envelope, is more or less lobulated. These organs are otherwise perfectly healthy, as is also the bladder.

Except the acute pulmonary catarrh and the partial pneumonia, evidences of which were found in the post-mortem examination, the disease of the patient before us was without complication; and there would be no deficiency in the history of the case, which is so interesting on account of the number and accuracy of its details, if the intelligence of the patient had allowed the author to assure himself of the origin of the disease, and of the fact of the occurrence or otherwise of *paroxysms* of dyspnœa. However this may be, the condition of the lungs, compared with the results of auscultation and percussion, are well worthy of attention. The cells of the upper left lobe were generally more dilated than the corresponding ones on the right side; and the percussion far from being less sonorous—the respiratory murmur, instead of being more feeble at right than left, at the distance of an inch from the clavicle, presented entirely opposite characters. However, as Jackson remarks at the conclusion of the above case, what did it require in order that the percussion should be more sonorous anteriorly at right than left, in about the upper three fourths of its height? Merely that the amount of air corresponding to it should be greater than on the left side; which in fact was the case, considering the preponderance in volume of the middle and inferior lobes over the corresponding portion of the left side. On the other hand, what was necessary in order that the respiratory murmur throughout the same extent should be a little less feeble at right than left? That the most superficial vesicles of the middle and upper lobe, those in which the entrance of air is heard, should be more dilated than on the left side in the same lobe; and this also was really the case. So that the above circumstance, which might have been considered at first sight, for want of a certain degree of accuracy, as an exception to the rule, is on the contrary a confirmation of it. Every where in the upper half of the left lung the cells were more dilated than in the corresponding portion of the right; and every where, also, the respiration was more feeble in the first than in the second. However, it cannot be doubted that the differences above mentioned, relative to the sonority and intensity of the respiratory murmur on each side in front, were augmented in consequence of the acute catarrh, which existed, contrary to what is usual, on the left side alone.

Further, one of the facts which deserves most particular attention

here, is, as has already been said, that there was in the above case no complication of chronic disease, or the least obstruction to the circulation; consequently, we cannot attribute the dyspnœa which the patient had experienced for several years to any cause but emphysema.

This case also is one of the most remarkable examples of what has been stated in the general description—viz., that the dilatation of the pulmonary vesicles is generally greater along the free border than elsewhere. We have seen, in fact, that in some points this border was thicker by six or eight lines than in the natural condition; that at the summit of the left lung it passed the median line, &c. It should also be observed, that notwithstanding the extent and severity of the lesion, the bronchial tubes were not dilated; that some of them appeared merely a little thicker than natural.

*Pains in the Chest.*—1. *Amongst the patients who left the hospital more or less relieved*, fifteen out of thirty-two who were examined in reference to this point, or about one half, had pains in the chest; and in thirteen cases these pains were situated on the side of the thorax, where the prominence so often mentioned existed. These pains, the character of which I could not determine, came on at very different periods, from one to three or four or even a greater number of years prior to the time at which the patients came under our observation. They were not increased by inspiration or coughing, and on this account could not be attributed to chronic inflammation of the pleura, as also because the seat of the pain was commonly the anterior surface of the chest, which corresponds to that part of the lungs which is found free from adhesion in emphysema, as well as in other diseases, except only where the adhesions are general. Neither could they be attributed to extension of the thoracic parietes, because this extension, when it is the result of an effusion not consequent upon inflammation, is not accompanied by pain; and as these pains had their seat thirteen times out of fifteen on the same side with the prominence, and in the part which corresponded to it, we are obliged by the method of exclusion, and, as it were, in spite of oneself, to attribute them to the dilatation of the vesicles themselves.

Although this is the only conclusion which can be drawn from the facts which I have stated, it does not yet appear to me perfectly clear; and before admitting it as rigorously established, I should like to have a greater number of cases, all of which should be carefully examined in reference to the point in question, and also some histories of fatal cases. I do not, however, make the above proposition for the purpose of surprising the reader, but to satisfy his mind; for there is complete harmony between the principal seat of the disease, its chronic course, and the duration and seat of the pain. Besides, we can hardly suppose that the excessive dilatation of the cells, which, from the size of a grain of sand, became as large as a hempseed, or a pea, or even larger, and of which dilatation there is not another example in the economy—we can hardly con-

ceive, I say, that such a dilatation should be brought about without pain, at least of an obtuse character, or without greater or less uneasiness in the part.

2. *In the patients who died*, the pain in the chest was too imperfectly studied to admit of our treating of it generally ; therefore, I shall not stop to consider it.

§ VI. *Of the cough*.—1. *In the patients who left the hospital more or less relieved*, cough occurred in every case, except in one which we have already treated of, when upon the subject of dyspnoea, at various periods of the disease and of various degrees of severity, constant or almost constant in some, with more or less considerable intermission in others. In fact, it presented the latter character in nineteen out of forty-four patients in whom it was carefully studied, or rather less than half.

As to the period of its commencement, it occurred simultaneously with the oppression twenty-two times in forty-six cases where this point is mentioned ; fourteen times afterwards, and ten times before. The latter cases were a little less frequent in the patients whose history Jackson has recorded, than in those which I have observed myself. This circumstance is owing less perhaps to a mere coincidence than to the fact that Jackson, having collected his cases subsequent to the period at which my attention and his own were more particularly directed to the first appearance of the dyspnoea, may have determined this point with greater precision. The latter supposition is the more probable, as the same physician found a greater proportion of cases in which the dyspnoea dated from early youth or infancy, than that which resulted from my own observations.

Moreover, it is well worthy of remark, that the cough, whether continued or intermittent, did not in any case accompany the dyspnoea at its commencement, when the latter dated from early infancy ; and, on the other hand, that it did not appear subsequent to the oppression, where the latter commenced at about the age of twenty years, or later, except in a single instance. Hence it will perhaps be asked if I have not fallen into a serious error in dating the origin of emphysema from early youth, in those cases where the dyspnoea commenced at that time. But this doubt will soon be dissipated, if it is recollected that the cough was far from being constant in every case ; that in one of these, even, it had not shown itself at all, notwithstanding that the most marked physical signs of emphysema had existed for some time ; that hence it is not essential to the disease ; that besides, the character of the dyspnoea, both previous and subsequent to the occurrence of catarrh, was always the same ; and, finally, that dyspnoea is not one of the necessary symptoms of pulmonary catarrh. I will add, that Mr. Lediberder has more than once observed emphysema of the lungs upon the dead bodies of infants who had died during the first weeks or months of existence, and that, consequently, we cannot doubt the existence of the affection in the earliest periods of life.

Further, in those cases where it existed without intermission, the cough was generally very slight, except during paroxysms of



dyspnœa, which were frequently owing to acute pulmonary catarrh, and during winter.

2. *In the patients who died*, the cough followed the same course, under similar circumstances, as in those whom we have just spoken of; so that the farther we advance in the study of the symptoms, the more clearly we perceive the parallel established between the patients who died and those who left the hospital more or less relieved; which removes every doubt in relation to the character of the disease in the latter cases. In fact, out of fifteen patients who died, three had no cough till some years after the commencement of the oppression, and this latter dated from infancy. In a fourth, on the contrary, the cough—a constant cough—preceded the dyspnœa by ten years; it appeared along with it in the others, except in the case of one patient, who had had dyspnœa for fifteen years when he died; a dyspnœa which could not be attributed to an affection of the heart, which existed it is true, but the first symptoms of which appeared only two years before the fatal termination.

§ VII. *Of the sputa*.—1. *In the patients who left the hospital more or less relieved*, it was impossible to get exact information in relation to the character of the sputa previous to their admission into the hospital, so that we shall only speak here of what took place in this respect after the patients came under our own observation. In thirty-five cases the sputa were carefully examined, and the following circumstances observed. In twenty-three cases they were more or less frothy, freely aerated or liquid, and resembling a solution of gum; in the twelve others they were greenish, thick, opaque, but slightly aerated, not globular (*pelotonnés*) however, or grayish, with some streaks of blood.

Moreover, with two exceptions, these sputa were connected with two altogether different states of the lungs. Those which were opaque and more or less of a greenish hue, were found in patients affected with acute pulmonary catarrh, accompanied with subcrepitant râle; those which were frothy, freely aerated, like a solution of gum, or, as it were, semi-vitreous, occurred along with chronic pulmonary catarrh, accompanied by a whistling or sonorous râle. The two exceptional cases were those of two individuals, one of whom had opaque sputa with whistling râle, whilst the other had them freely aerated and not opaque, with a subcrepitant râle. Besides the emphysema, did there exist, in the first of these two cases, a certain degree of dilatation of the bronchia, or merely of chronic inflammation, of thickening and redness of these organs?

The greenish and opaque sputa were undoubtedly accidental; that is, the effect of acute pulmonary catarrh; the others were habitual. And if we had studied them more fully, or during the whole time that the patients remained in the house, we should most probably have observed the passage of the sputa belonging to the acute stage, into those of the chronic. However this may be, it is worthy of remark, and the fact has already been mentioned, that among the thirty-five patients of whom we are at present speaking,



one only, a woman of fifty-seven years of age, had had spitting of blood, and that to a slight degree. This woman had not had her menses since the age of twenty-seven, in consequence of a severe fright, caused by the explosion of the infernal machine, which produced a suppression of the periodical flux then upon her; and these slight spittings of blood (three or four spoonfuls in twenty-four hours) recurred three times, and only during the last three years. These moderate or rather slight spittings of blood were of themselves by no means characteristic; auscultation and percussion, carefully employed, gave no signs of the existence of tubercles at the summits of the lungs, and perhaps, in fact, they did not exist. But whatever was the cause of this hæmoptysis, its absence is not the less remarkable in the other thirty-five patients who had been subject for a longer or shorter period, the mean duration of which was ten years, to a pulmonary catarrh, which was either permanent or of frequent recurrence; for as the lungs must have been jarred in a thousand different ways during this length of time, one would say, at first sight, that they ought to have been the seat of more or less frequent hæmorrhagies.<sup>1</sup> What more decided proof could we have of the necessity of a special cause for the production of hæmoptysis?

2. *In the patients who died*, the sputa presented the same characters as those above described, and they were examined in such a small number of cases that we shall not speak of them more in detail.

§ VIII. *Palpitations, œdema*.—1. *In the patients who left the hospital more or less relieved*, palpitations occurred in a large number of cases, without, however, occasioning any great inconvenience to the patients, who did not call our attention to this point. Twenty out of thirty-eight experienced them at various periods, and ten of these only at times when they exerted themselves very much, or when walking, or during paroxysms of dyspnœa: and it seems probable that this proportion of cases in which palpitation occurred, would be the same were the numbers increased, inasmuch as it was the same in the cases which Jackson has recorded, as in those which I observed myself.

In one of the cases where the palpitations were permanent, the latter, so far from augmenting, gradually diminished. With the exception of those patients who only experienced them momentarily, they commenced with the dyspnœa only in one instance, and in the others they came on at various periods subsequent to the first appearance of the latter symptom. Commonly, indeed, they showed themselves after the disease had run the half of its career, and even much later in some patients who were over sixty years of age, with whom the dyspnœa dated from infancy, and who had had palpitation for only a year, or even less, when they were admitted into the hospital.

<sup>1</sup> This woman has lately returned to the hospital, presenting some physical signs of tubercles on the right side at the summit.

2. *In fourteen of the patients who died*, careful enquiries were made in relation to the palpitations. These were wanting in four of them; were feeble and not frequent in three, and were more or less strong and pretty constant in the remainder, or about half the cases. This proportion is a little greater than that which was found in the first series. The heart, with two exceptions, was large in those who had had constant palpitations; a circumstance which no one will be surprised at, since observation has taught us long since that this is the case in a great number of instances.

In the patients who died, too, as in the others, the oppression preceded the palpitations, and frequently for a considerable length of time; so that in eight cases where the precise period at which the dyspnœa and palpitations commenced could be determined, the mean duration of the latter was seven, whilst that of the former was twenty years at the time of the patient's death; and in every individual case the dyspnœa preceded the palpitations by several years. The greater part of the patients who died, after having had constant palpitation for a certain length of time, having also had the heart enlarged, we should conclude that the same was true, under similar circumstances, of those who left the hospital more or less relieved; and the circumstances connected with the œdema, at the same time that they confirm this conclusion, point out pretty clearly the particular cases in which enlargement was really present. In fact, every patient who died after having had, for a longer or shorter period, œdema of the lower extremities, had also his heart enlarged; and, on the contrary, no one who had not œdema was found in the same condition. Hence it follows necessarily that when œdema shows itself in the course of emphysema of the lungs, we should attribute it, not to the latter disease, but to an organic affection of the heart. Among the patients who left the hospital more or less relieved, ten out of forty had œdema of the lower extremities, and always at a period long subsequent to the commencement of the disease, at a mean about twenty years. The œdema was generally slight, of momentary duration in three cases, about fifteen days in a fourth, of various degree of frequency and severity in the remainder, without, however, its having been constantly present from the time it made its first appearance. We may believe, then, independently of the symptoms derived from auscultation and percussion, that in the six last cases at least there was a certain amount of dilatation of the cavities of the heart; and we may do so with the more confidence, inasmuch as palpitations of longer or shorter continuance were found in every one of these cases.

It is easy to conceive, moreover, the slight utility of percussion when employed to discover diseases of the heart in such cases as those above mentioned, where the sonoriety of the chest is generally greater than natural, and often more so at the præcordial region than elsewhere, at which part, too, we frequently find a partial prominence.

§ IX. *Of the appetite and flesh.*—In the patients who left the hospital more or less relieved, as in those who died, the appetite was only diminished for a short time, as we have already stated in the general description, during a paroxysm of dyspnœa, when there was an acute pulmonary catarrh of greater or less severity. I have found but one exception to this rule, and that was in the case of a man sixty-four years of age, who had had dyspnœa from infancy. In him the oppression had very much increased within the last ten years, whilst, on the contrary, the appetite had very much diminished; the former promptly abated soon after his admission into the hospital, whilst the local symptoms of emphysema remained, and the appetite returned in the same proportion. So that in fact this patient, in whom there were no signs of tubercles, and who was well advanced in life, is rather a confirmation of the rule than an exception to it.

The *embonpoint* varied like the appetite, and owing to the same causes. The patient of whom we have just spoken had grown much thinner within the last ten years, during which the dyspnœa had been considerable, and he resumed his usual *embonpoint*, or nearly so, in proportion as the oppression diminished. Three patients had lost flesh pretty rapidly for three months previous to their admission into the hospital, although the dyspnœa was not great. These three were tuberculous. Hence it follows that if we observe a considerable and rapid loss of flesh in an individual affected with emphysema, where the dyspnœa is moderate, and the habitual pulmonary catarrh has not very much increased, we ought to suspect the presence of tubercles, of which, no doubt, a further examination would confirm the existence.

### ARTICLE III.

#### OF THE DIAGNOSIS.

The details which we have given, when treating of each particular symptom, leave but little to be said in relation to the diagnosis; or rather, these details seem to me to establish it clearly. In consequence of the importance of the subject, however, it will be better perhaps to recur to it; and in order to render an acquaintance with it more easy, I shall place before the reader a summary view of emphysema, which may be thus defined:—

A disease without fever, of long duration, which often commences in early youth,<sup>1</sup> very rarely after fifty years of age, by a slight dyspnœa, which commonly continues without aggravation for a great number of years, when it dates from infancy, afterwards becoming successively more and more marked, and accompanied with paroxysms, during which the patients appear sometimes to be menaced with suffocation. This dyspnœa is frequently preceded by cough, and almost always accompanied, at some period or other of its course, by pulmonary catarrh, which, when aggravated, is

<sup>1</sup> This fact has been mentioned by Laennec.



one of the most common causes of *paroxysms* of dyspnœa. Connected with these symptoms we find an alteration in the form of the chest, which alteration is generally limited in extent, and consists in a prominence in which both the ribs and intercostal spaces are equally interested, and the most common seat of which is the anterior part of the chest and the supra-clavicular regions. In these elevated portions, the percussion is more sonorous and the respiration more feeble than in the natural condition, and in the other parts of the chest. A sibilant (*sifflant*) or subcrepitant râle is often mixed with the respiratory murmur. In some patients, and at a more or less advanced stage of the disease, we find palpitation, with œdema of the lower extremities. There is no loss of flesh, except when tuberculous disease is also present, or during the course of acute catarrh, which frequently complicates the principal affection, or when the dyspnœa from any cause is great, and continues so for a length of time. Finally, when the patients die, we find, upon opening their bodies, a greater or less dilatation of the pulmonary vesicles.

It is clear that a disease which presents such a group of symptoms cannot be mistaken for a chronic pulmonary catarrh; for, as I remarked above, the latter does not give rise to paroxysms of dyspnœa, to prominences of the chest, to *constant* diminution of the respiratory murmur. Neither can we confound it with dilatation of the bronchia, in which the respiration, instead of being weaker, is stronger, throughout a certain extent, than in the natural condition—bronchial as it is called—and the voice resonant. It cannot be mistaken for a tuberculous affection, since, instead of a flat sound in one part, as in the latter, the sound is clearer than common, and there is no loss of flesh, except in the circumstances mentioned; neither is there any febrile movement. It is distinguished from aneurism of the aorta, or any tumour which might compress the trachea or a large bronchial tube, by the dyspnœa in these cases being more severe and more constant, and generally accompanied by a whizzing sound, which does not occur in emphysema. The sound of the chest, too, so far from being clearer in one part than in the natural condition, is frequently more or less obscure, and we hear in a certain number of cases a double anormal sound, &c. &c. It does, to be sure, sometimes happen, and a case of this kind came not long ago under my observation, that in an aneurism of the aorta which was not prominent, and compressed the trachea, and, doubtless, also one of the large bronchial tubes, the respiration was absent, or nearly so, in a considerable part of one side of the chest where the percussion was also very sonorous; both of which circumstances are observed in emphysema. But there was no corresponding prominence, so that, with a little attention, error was impossible; and if such a case should present itself, it ought not to be confounded with emphysema.

With the exception of the palpitations and œdema, which indicated complication of disease of the heart, the other symptoms were



present in almost every case whose history has been recorded by Jackson and myself; and in the small number of exceptional cases, the existing symptoms were sufficient to dissipate every doubt in relation to the existence of emphysema. In fact, in the only one where dyspnœa was absent, the chest presented a prominence, accompanied by excessive sonorousness and considerable diminution in the force of the respiratory murmur, in the corresponding part. In the one where the thorax did not present a partial prominence, the respiration was throughout very feeble, and mixed with sibilant (*sifflant*) râle, the dyspnœa had existed for twenty years, and the paroxysms of dyspnœa, which were pretty severe, had commenced at a period long anterior to the occurrence of symptoms of disease of the heart. In the case where cough was not present, as all the other symptoms existed, there was no difficulty. But there would be real difficulty, if the emphysema was limited to the internal surface or base of the lungs, and we could observe neither prominence on the surface of the chest, nor decided diminution in the force of the respiratory murmur—a case of which kind came under my observation three years ago. Under these circumstances, in fact, the only symptom which will enable us to determine the existence of emphysema is the dyspnœa; but it is necessary that this dyspnœa should present all the characters mentioned when treating of this symptom, a slow course, more or less frequent paroxysms, &c. &c., and, besides, that it should not be accompanied by symptoms of aneurism of the aorta, or by those of disease of the heart. If, however, the latter did not show themselves till long after the commencement of the dyspnœa, we must still regard the case as one of emphysema of the lungs, as was done in the instance I have just mentioned.

It will be thought, perhaps, that we insist too much upon the difficulties of the diagnosis of emphysema—upon the means of distinguishing an extremely chronic disease, and which most commonly abridges but very little, perhaps, the term of existence. But in the first place, emphysema, in a certain number of individuals, seems to have an evident influence upon the production of diseases of the heart; and further, its symptoms are sometimes very severe, and then, as in all such cases, it will be confessed that it is important to know what disease we have to treat. This is especially important in order that we may not confound emphysema, when combined with pulmonary catarrh, with a disease incomparably more serious, and that is phthisis, as has happened to practitioners who were truly skilful, but at the same time but little acquainted with the disease before us; for what a wide difference there is between the prognosis of the two diseases, and, to a certain extent, between their treatment! Thus I have seen patients sent from the north into warm climates for an affection which appeared to their physicians to be a commencing phthisis, and who were, in fact, affected with only a slight degree of emphysema, combined with habitual pulmonary catarrh. I attended two young men who had been subject to cough and dyspnœa for several years, whose

friends were exceedingly anxious on their account, and who also were, in fact, merely affected with emphysema. Another circumstance, equally important, requires that pulmonary emphysema should be well understood, and that its diagnosis should be well established; which is, that, on account of its extremely chronic course, it complicates a great number of diseases, and hence, if a person is ignorant of its symptoms, he might and would refer some of them to the intercurrent affection, and consequently commit serious errors. This is especially unavoidable as regards chronic affections which are accompanied by dyspnœa, particularly if these affections, like organic diseases of the heart, are influenced in their production by emphysema; in which case, undoubtedly, there would be attributed to the disease a degree of difficulty of breathing which does not belong to it, and its commencement would be dated from a period much too remote. Undoubtedly many histories of organic diseases of the heart are of this kind, and I do not except forty-five of this sort, which I collected with care at the time that I devoted myself entirely to observation, because doubts, and probably legitimate ones, arise at present in my mind, whether in some cases, where the disease appeared to be simple, it was not, in reality, complicated—whether the dyspnœa was studied with sufficient precision, and the period of its commencement fixed with certainty. So that, in reality, diseases of the heart should be studied, at the present day, in all their forms; in which study, the history of particular cases of those diseases heretofore published can be of but little service.

Again, even when emphysema is slightly marked, and is complicated with another disease, it is always possible, with a little attention, to recognise it. The following case is a proof of it.

#### CASE V.

Dyspnœa from infancy; augmented during the last twelve years, and especially about two months before admission into the hospital, with loss of flesh—Chest flattened at left, prominent at right, anteriorly—Percussion obscure at left, sonorous at right—Respiratory murmur replaced by gurgling at left, very feeble at right, in the part corresponding to the prominence—Dilatation of the pulmonary vesicles of the right side—Tuberculous excavations, &c. &c.

A workman on the wharves, aged fifty-five years, tall (five feet six inches), was admitted into the hospital of La Pitié on the 20th of May, 1833. He had never left Paris from the time of his birth, except between the ages of fifteen and thirty-two, when he was employed in the army. At the age of seventeen, he had been confined to his bed for two months by a severe attack of disease; at the age of twenty-six, he was again confined to it for six weeks by a pneumonia (cough, oppression, fever, pain in the left side); from which time until lately he had no attack of severe disease. Subject to short breath, and obliged to lie with his head elevated when in bed, from infancy; his dyspnœa had increased within the last twelve or fifteen years, and for several years back he had often been

obliged to sit upright at night, in order to get breath. Besides that, he had had, for some months past, without being able to state the matter more precisely, an habitual cough, a fresh accession of dyspnoea, and, at times, pains on the left side of the chest. For two months back, the anorexia has been almost complete, and the loss of flesh considerable. For the rest, there was neither hæmoptysis, nor palpitations, nor œdema of the lower extremities, nor diarrhœa.

On the 14th of June, having for the first time, in addition to the signs of tuberculous disease, discovered emphysema of the lungs, I examined the patient with attention, says Jackson, and found him in the following condition:—Loss of flesh and debility more marked than in the month of May; deglutition easy; no pain in the throat; anorexia, thirst, nausea only after coughing; belly soft, supple, without pain; daily stools; position in bed varied; sputa abundant, yellowish, opaque, distinct; respiration thirty; chest flattened anteriorly at left, especially above the nipple; prominent, on the contrary, at right, at the latter part, principally on a line with the junction of the ribs and their cartilages; percussion flat at left, anteriorly and posteriorly, less completely so below than above, also at right, under the clavicle, becoming less so as you descend; below the nipple indeed, and especially opposite the prominence mentioned, the percussion is extremely sonorous. The respiratory murmur is absent at left anteriorly, where nothing is heard but gurgling throughout. Behind, on the same side, nothing but gurgling and broncophony are heard at the upper part, whilst in the middle third the respiration is bronchial, and below it is vesicular. At right, under the clavicle, the respiration is rude, obscure, accompanied with gurgling; it is vesicular, and very feeble beneath the nipple, especially on a line with the above-mentioned prominence, less feeble behind in the corresponding part, and bronchial at the summit. The sound of the heart is feeble, not accompanied with impulsion; pulse 108, skin hot, head free.

The same condition of things was found on the following day, and subsequently; the patient had slight stupor, and died unexpectedly on the 21st, at one o'clock in the afternoon, having complained for some minutes previously of pain in the side, and sudden sense of suffocation.

*Opening of the body twenty-two hours after death.—External condition.*—Advanced stage of emaciation.

*Head.*—Hardly any infiltration under the arachnoid, pia mater very moderately injected and easily detached; cortical substance not deeply coloured; the medullary firm, not much moistened, and but slightly injected; three or four small spoonfuls of bloody serum in each of the lateral ventricles. The cerebellum, pons varolii and medulla oblongata, all natural.

*Neck.*—Larynx, epiglottis, and trachea, pale or of a livid green; their mucous membrane otherwise healthy.

*Thorax.*—Right lung free, except at the summit and posteriorly, large and heavy; its middle and upper lobes do not crepitate, and are hard throughout in places, except along the free border; the



inferior lobe crepitates almost every where; its cells are universally and unequally dilated, being from two to five times larger than common, and this dilatation is most marked at the base along the sharp edge, which is more rounded than common. The two middle and upper lobes contain a considerable number of crude tubercles, surrounded by a grayish tissue, not granulated; and at the summit of the upper one are found two or three small excavations, irregular at their circumference and lined by a very thin false membrane. The bronchial tubes of this lung are generally a little less transparent than natural, and some of them in the inferior lobe are a little dilated. The left lung is heavy, adheres throughout its whole extent to the costal pleura, is large, but less so than the right one, and is supple only behind and inferiorly. Its vesicles are no where dilated. At its summit there is a cavity of the size of a hen's egg, lined by a membrane of no great thickness, surrounded by a grayish tissue like that which has been described, which tissue is studded with tubercles, and constitutes almost the whole of the upper and a part of the lower lobe. A small tuberculous cavity was also found a little below the summit of the lower lobe; another about the size of a large nut was found near the base of the organ, behind, and was formed by a simple dilatation of the bronchial tubes; and at this point the dilated bronchium was precisely of the same aspect and thickness as that of which it was merely a continuation. Besides this bronchium, there were still seen two others in the same lobe, evidently dilated, and containing a yellowish opaque matter of the consistence of pus. With the exception of the bronchial tubes, which communicated with the upper cavity, and which were red, the others were pale, and like those of the right side, less transparent than natural. The pericardium contained a little bloody serum.

*Abdomen.*—Œsophagus pale, deprived of epithelium in its lower half; stomach three times its natural size, containing scarcely any thing but gas; its internal surface of a livid green, and no where injected; its mucous membrane mamelonated about two inches from the pylorus only, and over a very small surface, softened, and so much so in the large cul-de-sac as not to allow of strips being raised, whilst along the great curvature and upon both faces, strips of from four to five lines were obtained, and along the small curvature of from seven to eight lines, its thickness throughout being natural. Small intestine distended with gas, triple its usual size, but resuming its ordinary dimensions after being opened; containing in its upper half a liquid of the colour of wine lees, which afterwards became brown and then yellow. Its mucous membrane was generally of the same colour as the matters with which it was in contact, and of natural thickness; softened and more adherent than common to the sub-mucous tissue in its upper half, where strips could not be raised; beyond this portion giving strips of from three to six lines, which became longer the nearer you approached the cæcum. In the course of the intestine, also, were in twelve ulcerations, some transverse, others longitudinal and



situated on the plaques of Peyer, about twelve lines long by from three to six broad, with prominent edges, the bottom being formed by the muscular tunic or by the thickened sub-mucous cellular tissue. Crude tubercles also existed opposite some of these points, under the peritoneal coat; softened tubercles existed in other parts, not ulcerated, and immediately beneath the mucous coat. The large intestine was also very much distended, and contained pultaceous matters, not moulded. Its mucous membrane was pale or of a livid red, not evidently thickened, and of a pulpy consistence; a single superficial ulceration was found in the middle of the transverse colon, about six lines in diameter. Liver rather large, pale, yellowish, fatty, of good consistence. Gall-bladder small, containing a small quantity of clear liquid. Spleen pultaceous, blackish, a little augmented in size. Kidneys of a livid red, easily penetrated; a small layer of cortical substance is raised when their enveloping membrane is torn off. Bladder small, and besides perfectly healthy.

In this patient, as in many of those whose history we are examining, the dyspnœa dated from infancy; it had increased during the last twelve years, and frequently within this period had assumed the form of paroxysms more or less painful at night; that is to say, it had followed a slow course, and presented all the characters of that form of oppressed breathing which occurs in emphysematous patients; and we may suppose that it was on this account that the attention of the observer was fixed upon a case of phthisis apparently of little interest. The prominence on the right side of the chest, the increased sonorousness, and on the contrary the diminished respiratory murmur in the same part, must have confirmed the data furnished by the dyspnœa; and finally anatomy placed its seal upon the diagnosis, which is worthy of note; not on account of the difficulties which it presented, but on account of the accurate application to a particular case of the data derived from experience. Similar cases must frequently occur, and be regarded as cases of simple phthisis. I observed one such ten years ago, at a time when emphysema but partially engaged my attention, and I then regarded, as an unsolved problem, a fact which now undoubtedly I could easily account for. I stated, indeed, in my researches in relation to phthisis, that in the ninth part of the tuberculous patients observed by me, the dyspnœa dated from infancy; that nevertheless this symptom could not be referred to the tubercles in these patients, many of whom were over fifty years of age; and I postponed to a future period the explanation of a fact, which further observation might easily, at least every thing seems to favour the supposition, have unraveled.

It may further be readily imagined that in cases analogous to that of which we are speaking, the symptoms of emphysema become every day less marked; that they finally disappear completely; and that on opening the body there are found scarcely any traces of the disease which was believed to have been both extensive and severe. We may imagine this change to take place through the development of the tuberculous affection, which might occupy, after a

certain length of time, all, or nearly all the parts which were primitively the seat of emphysema. This, which might easily have been foretold, I have recently observed in a woman aged thirty years. When admitted for the first time into the hospital, she presented, on the right side of the chest, the physical signs of tubercles not far advanced, and of well marked emphysema. A careful exploration, repeated several times during the first residence of the patient in my ward, always led to the same result. Having been somewhat relieved of the dyspnœa, which was extreme at the time of her admission into La Pitié, she went out after having remained some weeks. Soon after, she returned on account of the same symptom, but then every thing was changed. The extreme sonorousness of the right side of the chest had disappeared, and given place to a sound rather less clear than natural; the respiratory murmur was rude, and as it were bronchial, in some parts where it was scarcely heard before; whilst on the left side, anteriorly, there were found simultaneously in one and the same part, a well-marked prominence of the chest, an unnatural sonorousness, and a very feeble respiratory murmur. The patient in question again left the hospital after remaining there two months, and although the diagnosis was not verified by anatomy, it seems to me impossible to doubt its correctness. The emphysema must have been developed very rapidly on the left side, whilst on the right, where it was present to a remarkable degree at the time of the first admission of the patient into the hospital, it must have been masked by the progress of the tuberculous affection. Facts of this kind would not prove, as has been seen, either that the symptoms mentioned as characteristic of emphysema have not this value, or that emphysema itself can promptly disappear; and it is chiefly for this reason that I have thought proper to speak of the case in question.

It ought also to be remarked, in relation to the preceding case, that the emphysema was limited to the right lung, and that it was on the left side that the principal dilatation of the bronchia existed; so that this case is one of those which prove that the dilatation of the bronchia and that of the pulmonary vesicles are independent of one another.

*Course of the Disease.*—We have seen, when treating of the dyspnœa, that the course of the disease, although essentially chronic, was subject to great variations. In many patients it continued for a great number of years in a mild form, with but little change. In others it came on with some violence at the very first, whilst at the same time the patients thus attacked were not prevented from attaining a considerable age. It would also seem, from the example just quoted when treating of the fifth case, that the progress of emphysema may be pretty rapid in some patients. This proposition, however, is derived merely from one case, the history of which I collected in 1833, and which does not belong to the series which we have been analysing. This case is interesting on several accounts, and I deem it proper for this reason, and on account of the rarity, or at any rate the probable rarity, of similar ones, to give a detailed account of it here.

## CASE VI.

The widow Marion, aged thirty-eight years, of a delicate constitution, but generally quite healthy, was admitted into the hospital of La Pitié, the 16th of November, 1832, on account of cephalalgia, which she had had for three years,—which had followed a violent moral emotion, and had afterwards continued almost uninterruptedly, so that the patient had not at any time been free from it eight days together. During the whole time her intelligence remained perfect, as well as the power of motion and organs of sense, only her appetite and strength diminished a little; her menses appeared but eight times during the same period, and for the last time about eight months previous to her admission into the hospital. Leeches and blisters have been applied behind the ears, and venesection had been practised without any success.

The more difficult it was to discover the cause of the cephalalgia, the more carefully the patient should have been, and in fact was, examined at the period of her admission. At that time all the functions were found in the natural condition, the respiration good, the percussion of the chest quite sonorous, and no cough.

As no circumstance obliged us to make use of active and prompt medication, the patient merely took demulcents for six days, after which she was bled in the foot six ounces without relief; the pills of Miglen, taken three a day, were scarcely more successful. Finally, the 3d of December, some days after the discontinuance of these pills, a blister three inches in diameter was applied to the occiput, and by the following day the headache disappeared and never returned.

Up to the 6th of January nothing worthy of note; the patient was examined and interrogated every day, but complained of no uneasiness or pain in any part; eat three fourths of a portion, and remained in the hospital merely on account of some remains of feebleness which was not yet entirely dissipated.

But on the 6th, in the evening, slight hæmoptysis, which it was not thought proper to combat by bleeding. On the 7th, in the morning, a more considerable hæmoptysis (eight ounces of blood in two hours), subcrepitant râle accompanied with sonorous râle on the anterior part of the chest (v. s. 3xii.) considerable relief followed the bleeding, and the spitting of blood did not return during the night.

On the 8th, in the morning, respiration slow, pulse 112, respiratory murmur and sonorousness of chest natural and similar at corresponding points; no pain any where, tongue a little whitish, three ounces of liquid blood in the spitting vessel; that drawn from the vein was covered with an orange coloured crust, three lines thick at its circumference; (barley emulsion, gum potion, emulsion 3vi., ten leeches to thighs). From this time to the 4th of February, the day of her death, the following circumstances were observed:—

The hæmoptysis recurred, but slightly, on the 14th and 15th of

January. On the 16th it had almost entirely disappeared, and did not again return.

The cough, which as late as the 13th still continued slight, became very inconvenient on the 26th, and continued so with some variations afterwards.

The dyspnœa, which had always been pretty severe from the time that the cough commenced, might be said to be excessive on the 30th, from which time to the day of her death the patient remained almost entirely upright in bed.

Percussion of the chest repeated several times from the 13th to the 30th, was found to be rather more sonorous beneath, above, and behind the right clavicle than the left. On the 13th, also, the respiratory murmur was purer under the left clavicle than under the right in the corresponding point, where, however, there was no distinct râle. But after the 26th a subcrepitant râle was constantly heard in this same region and behind on the same side, throughout its whole height; it did not exist at left behind till the 28th, and in front only after the 1st of February. A rude and somewhat bronchial respiratory sound was besides found at right posteriorly, above and below the root of the bronchia, for several days. The naturally feeble voice of the patient was almost extinct on the 1st of February.

The pulse, which was constantly very frequent, was 140 on the 31st, less frequent, by a few beats only, afterwards. There were copious sweats after the 1st of February.

Her appetite had not entirely gone on the 16th of January, and it rapidly grew worse subsequently.

On the 4th, at the period of the visit, the patient was in a state of stupor, and complained of not understanding what was said to her. A short time previous, at five o'clock in the morning, she told the sister that she had not passed so good a night for a long time, and by noon she was dead.

Sulphuric acid, lemonade, and a gum potion, with 15 grains of rhatany, were prescribed on the 15th of January, and agreed well with the patient. Eight ounces of blood were taken by venesection on the 28th, which was covered by a crust two lines thick at its circumference. A half ounce of syrup of white poppies was daily mixed with the potion after the 12th, and three grains of kermes were added to it after the 1st of February.

*Opening of the body twenty-one hours after death. External condition.*—Second stage of emaciation; no lividity; slight rigidity.

*Head.*—Nothing remarkable exterior to the dura mater; a small quantity of black blood in the cerebral veins posteriorly; very slight infiltration under the arachnoid at the same part; arachnoid otherwise healthy; pia mater very little injected, and only behind; a small spoonful of serum in each lateral ventricle; the whole substance of the brain very little injected, of natural colour and firmness.

*Neck.*—Pharynx, œsophagus, epiglottis, larynx, and trachea, in a natural state.



*Chest.*—Lungs perfectly free, except some adhesions at the right summit: both of them large, and not collapsed by the opening of the chest. Right lung twice as heavy as natural, partly on account of a slight engorgement of the inferior lobe (sanguine infiltration), partly owing to other lesions, which will be described in order. Its cells were every where dilated, and three, four, or five times larger in diameter than natural; that of a considerable number of them near the sharp edge being from one to two lines, so as to form, when opened, small excavations, not lined by false membranes. Both tubercles and demi-transparent gray granulations also existed throughout the whole height of the organ, diminishing in size and number from the summit to the base; and at one inch and a half from the top were found two small excavations, of two lines and a half in diameter, filled with pus and lined by a thin and soft false membrane. The bronchial tubes contained a pretty large quantity of thick mucus, and were all of them evidently dilated. Those of the upper lobe were less so than the others, without any appreciable alteration in their colour or thickness; those of the middle lobe were a little thickened; those of the lower lobe were both thickened and red, and many of them contained transverse folds, valvular as it were, formed by the thickened mucous membrane, and at the same time were from three to five times larger than natural. The left lung was a little less heavy than the right, but otherwise presented the same lesions, with the exception of the tuberculous excavation, which did not exist in it, and the dilatation of the cells which was also a little less considerable than on the right side. The pericardium contained a spoonful of limpid serum; the heart was of moderate volume and firmness.

*Abdomen.*—The stomach was of medium size, looked as if it were strangulated in the middle, and contained a small quantity of greenish and very unctuous liquid. Its mucous membrane presented an arborisation of an inch in extent near the pylorus, was pale every where else, of good consistence and thickness throughout, and not mamelonated. The small intestine was of the usual size, contained a yellowish matter in its first half, whitish in the remainder, under which was found a pretty large quantity of mucus. Its mucous membrane was of natural thickness and consistence. (Strips of from six to eight lines throughout its whole extent.) The glands of Brunner numerous. No ulceration or tubercles any where. The sub-mucous tissue of the ileum was slightly injected. The large intestine was not at all remarkable as regards its size; contained pultaceous matters in its first portion, and moulded ones afterwards; its mucous membrane was injected in a good many places, not thickened, and gave throughout strips of only two or three lines; numerous crypts, confluent at intervals, existed in the first half of the organ. The liver was higher by an inch and a half than it was broad, extended as far as the fifth rib, without any appreciable alteration. The gall-bladder contained a pretty large quantity of a dark-coloured liquid. Nothing else remarkable.

Thus, after a month's cough, with bloody sputa, fever, rapidly

increasing oppression, and a pretty severe hæmoptysis at the commencement, the patient dies; and we find, upon opening the body, a general emphysema of the lungs, of very marked character, rather more so at the right than at the left summit, accompanied with general dilatation of the bronchia, and with tubercles, both the number and size of which went on diminishing from the summit to the base of the organ. Now, as it is impossible to refer the origin of the dyspnœa, or of the tubercles, or of the dilatation of the bronchia, or that of the pulmonary vesicles, to a period more remote than that of the first appearance of the hæmoptysis, we must admit that this short space of time was sufficient to allow the advance of the triple disorder which we have noticed, to the stage in which it was found. We cannot date the lesion of the lung beyond the period mentioned, both because the condition of the chest was carefully determined at the time of the patient's admission, and nothing abnormal found there, and because the same result was arrived at after a similar examination, repeated with still greater precision two days subsequent to the occurrence of the first hæmoptysis.

The rapid course of the dilatation of the bronchial tubes, of the pulmonary vesicles, and of the tuberculous development, being well established, we should observe that, with the exception of these changes, and of the softening of the mucous membrane of the colon, the other organs were healthy; that these lesions would not be sufficient to account for the death of the patient, if they had not been suddenly induced; and that hence this fact is a new proof, although an indirect one, of the extremely rapid course of the disease in the present instance.

Further, it is extremely probable that, when once the attention of physicians is directed to the study of emphysema, they will not fail, at least occasionally, to meet with cases of the kind above mentioned.

## ARTICLE FIFTH.

### CAUSES OF EMPHYSEMA.

The history of the cases which I have observed is very incomplete, with respect to the causes of the affection. The same is true of those whose history Jackson has recorded, except in one point of view, which will be mentioned at the conclusion of this article. Most commonly, we neglected to enquire into the circumstances which either coincided with, or for a certain length of time preceded, the commencement of the dyspnœa; so that, with reference to the present question, the analysis of our observations can be brought to bear only on a few points.

With the exception of those cases in which the dyspnœa dated from early youth, and in which the cough did not commonly supervene till much later in life; with the exception of these cases, I say, the oppression was very far from being always preceded by pulmonary catarrh, as has been previously stated; and in several patients this catarrh did not occur for several years after the com-

mencement of the oppression. Hence the inevitable conclusion is, that emphysema may, and very frequently does, in fact, originate independently of pulmonary catarrh. This conclusion is also somewhat confirmed by the fact, that pretty frequently the dyspnœa appears not to have augmented appreciably, in consequence of an attack of severe acute pulmonary catarrh. And if we recollect that the maximum of the emphysema is situated along the free border of the lungs and its neighbourhood, whilst acute severe pulmonary catarrh, on the contrary, is seated at the posterior-inferior part, we must conclude that if this catarrh has any influence upon the development of emphysema, this influence must be slight, and but rarely brought into play. On the other hand, pneumonia, notwithstanding the dilatation of the vesicles by which it is accompanied, seems also to have nothing to do with the production of emphysema (page 511); so that two of the affections which one would have supposed, at first sight, most likely to cause emphysema, either contribute very little, or not at all, so far as we could discover, to its production.

Nevertheless, Laennec regarded dry pulmonary catarrh as the cause of the dilatation of the pulmonary vesicles, and conceived that the latter resulted from the presence of a viscid mucus in these organs, which, as they could not easily relieve themselves from it, became necessarily dilated. But this explanation, which at first seems very natural, does not accord with the facts which we have already stated, and is in opposition also to the following one—viz. that whatever may be the size of the dilated pulmonary vesicles, even if they be as large as a cherry-stone, we find them empty and devoid of mucus or false membrane. In fact, putting aside the explanation of Laennec—and it seems to me that we must do so—we cannot account for the dilatation of the pulmonary vesicles; but what does it signify, provided the above facts be correct? Do we understand any better the dilatation of the bronchial tubes? Here, surely, we cannot attribute the dilatation to the prolonged presence of mucus in the dilated organ caused by an obstacle in its passage; consequently we must admit a different cause from that which presides over the morbid dilatation of most of our organs. This proposition cannot be questioned with reference to the bronchial tubes, since there are instances, as in Case 6, where the mucous membrane of the bronchia—instead of being tense, as it should be, if we suppose the dilatation mechanical—presents folds of a valvular form. So that here, as well as in emphysema, we must admit, at least in a great number of cases, a force analogous to that which presides over the extension of hollow organs, and in virtue of which these latter enlarge without our being able to account for it by means of any obstacle, or mechanical cause.

In two cases where the dyspnœa had existed—in the one for five, and in the other for thirty years—at the time when the patients were admitted into the hospital, it came on immediately after a violent moral emotion, and never afterwards disappeared. Was this



merely a coincidence? On the contrary, had the moral emotion some part in the production of the disease?

The question of its hereditary nature was studied by Jackson. In order to arrive at conclusive results in this respect, he made particular enquiries of a considerable number of patients in reference to the habitual state of health of their fathers and mothers, sisters or brothers; in reference to the disease of which they died, as also their age at the time of death. His questions were principally directed to the state of the respiration; to the duration of the difficulty of breathing, when it existed; to the condition of the limbs, their volume, &c. He regarded as established only those facts which were attested by intelligent patients, whose memory was good, and who uniformly gave the same replies to the same questions. Proceeding with this reserve, which is demanded by the nature of the subject, he arrived at the following results.

1. Of twenty-eight patients affected with pulmonary emphysema, eighteen were the offspring of parents who had been, either father or mother, attacked with the same affection, and several of whom had died in the course of it. In some cases, the same was true of the brothers and sisters.

2. Of fifty individuals not affected with emphysema, three only were descended of parents who laboured under this disease; whence it follows, every thing being otherwise equal on both sides, that emphysema is frequently an hereditary affection.

Another not less remarkable fact, for which we are also indebted to Jackson, is, that hereditary influence is much more marked in cases where emphysema dates from early infancy, than in those in which it commences just before or subsequent to the age of twenty years. At least this proposition seems to be rigorously derived from the following statement—viz., that of fourteen individuals whose dyspnœa was traced to early youth, fourteen had asthmatic parents; whilst of fourteen patients attacked later in life with emphysema, two only were the offspring of parents who had died of the same disease.

## ARTICLE SIXTH.

### FREQUENCY OF EMPHYSEMA.

Physicians having hitherto paid but little attention to emphysema, notwithstanding the labours of the illustrious Laennec, it will perhaps be asked—notwithstanding the numerous details into which I have gone in reference to the diagnosis, and the care which I have taken to show the relation which exists between the symptoms and the lesions from which they arise—it will be asked, I say, whether I may not have deceived myself, and whether emphysema is in fact as frequent as the preceding observations would induce us to believe. The greater part of the cases analysed in this memoir were in fact collected during the space of twenty months; and I have said above, that in a still shorter space of time—eight



to ten months—Jackson had observed forty-one patients affected with emphysema. But so far from admitting here an error by which the number has been exaggerated, I am convinced that Jackson did not recognise every case of emphysema which existed in the wards in which he conducted his observations; because he could not find sufficient time, notwithstanding all that which he devoted to observation, to enable him to study all the patients placed in my division, in such a way as to allow of his recognising emphysema of every degree in those who were attacked with it. Besides, the reader has not forgotten that, of fifty patients carried off by the cholera, and where the autopsy was made with great care, twenty-three were affected with emphysema at various degrees; and, as I have not chosen cases, we must conclude that emphysema is a frequent disease, at least in individuals who die at the age of those of whom we have been speaking, and which has been previously mentioned.

To be sure it will perhaps be said, on account of the dyspnœa which accompanies cholera, when it is severe, that this disease may have had some influence upon the production of the affection of which we are treating. But without discussing the reasons which would lead us to attribute the oppression of cholera patients to a cause altogether different from dilatation of the pulmonary vesicles, I will remark, that a dilatation so recent as that which we must here suppose, the cause of which could not have operated, in many cases, longer than a few hours before death, would very probably have disappeared in a few hours after the fatal termination; and that this dilatation followed the same laws, affected the same preference for certain parts of the lungs, as in those individuals who were carried off by other diseases, being more marked near the free border than elsewhere, and more frequent in old than in young persons. So that we cannot have the least doubt that the two affections, cholera and emphysema, were independent of one another.

## ARTICLE SEVENTH.

### OF THE TREATMENT OF EMPHYSEMA.

Doubtless it would, above all things, be most important to the reader, to find here laid down the whole of the means by which emphysema may be prevented, or, in other words, the prophylactic treatment of the disease. But, as we have seen above by an examination of the cases analysed, the causes of emphysema are nearly unknown to us. We merely know that it is often hereditary. Nothing can be said, then, positively upon this subject; and all we can do in a memoir like the present, where we have endeavoured to advance nothing which could not be rigorously deduced from the facts, is to state that it is proper, with a view to preserve ourselves from emphysema, to avoid the most general and best

known causes of disease, and of those of the lungs in particular, and also every thing which, according to the results of experience, may bring on, when emphysema already exists, an attack of dyspnœa—as exposure to dust, to an atmosphere more or less charged with deleterious substances, to moisture, &c., and, in general, to every thing which is capable of augmenting the symptoms of emphysema.

When once developed, it is necessary, with reference to the treatment, to distinguish the cases where emphysema is simple, from those in which it is complicated; those cases in which the patient experiences paroxysms of dyspnœa, from those in which paroxysms do not exist.

If emphysema is simple, mild, that is, accompanied by but little oppression, by slight pulmonary catarrh, with scanty and easy expectoration, without paroxysms of dyspnœa, it is proper—as results from the analysis of the facts previously detailed—to avoid violent emotions, exposure to dust, which I have several times known to bring on paroxysms of oppression, moisture, especially exposure to fogs, which is so often followed by coryza, and afterwards by pulmonary catarrh, or an increase of that which already existed, and consequent paroxysms of dyspnœa. The patient should avoid every thing which quickens the respiration and increases the necessity of breathing, fatigue of body and mind, violent and repeated emotion of all sorts, and too animated conversations. It would be well also to endeavour to find out whether change of residence, going from one city to another, would diminish the dyspnœa, since it is said that a considerable number of asthmatic patients (doubtless these persons were for the most part affected with emphysema) under such circumstances, have recovered more or less completely from their difficulty of breathing, whilst the dyspnœa resumed its primitive violence after they returned to their original places of residence.

As for the rest, I have never observed, whatever might be the severity of the pulmonary catarrh which accompanied the emphysema, that medicines called incisive, such as polygala, simple oxymel, oxymel of squills, amygdaline soap of soda, &c., so much recommended by Laennec, diminished, as he assures us, the dyspnœa and favoured expectoration. I do not doubt that Laennec attributed to the polygala, the oxymel, &c., that melioration which, in patients belonging to the working classes, is the result of repose in bed, of diet and the use of diluent drinks, as soon as they are admitted into the hospital—a melioration which is due, in fact, to all these means. That which I have just said of the polygala, applies equally to bleeding, in the cases above mentioned. One medicine only, and Laennec has mentioned it, had a happy influence upon the dyspnœa of the greater part of the patients attacked with emphysema of the lungs, whose history I have recorded; I mean opium in all its forms. Almost all those to whom I gave it were remarkably relieved, (twenty-six out of thirty of those in whose history I have carefully noted the phenomena which fol-

lowed the administration of this medicine,) and the symptoms resumed their pristine violence as soon as its use was suspended, unless they had been already quieted for a certain length of time.

But it is especially in severe cases, where the paroxysms of dyspnœa are very great, so that the patients seem threatened with approaching suffocation, that opium is useful, even if at the same time the presence of a very extensive subcrepitating râle seems to indicate that these paroxysms depend upon a violent acute pulmonary catarrh. Four times, indeed, I have been able to convince myself of it, in patients who were not over thirty-eight years of age, and who presented symptoms most readily recognised, of an almost universal emphysema, which was at the same time uncomplicated and far advanced. They were in a state of inexpressible distress when I saw them for the first time, breathing more than fifty times in a minute, the pulse very frequent, (120 to 140 pulsations in a minute,) subcrepitant râle at the posterior part of the chest, in its two lower thirds or three fourths. One of them was bled three times in two days without the least benefit, the dyspnœa remaining the same, and he appearing to be in a more critical situation after the third bleeding than before the first. I then had recourse to the gummy extract of opium to the amount of two grains in a few hours, and the next day the dyspnœa was very moderate, the respiration much less frequent, and the patient so much relieved that he believed himself cured. In the two others, no blood was drawn; opium was given almost immediately after their admission into the hospital, and the relief was not less prompt.

If the paroxysm of dyspnœa should be owing to an atmosphere charged with dust, it would be necessary, in the first place, to remove the patient from it, and place him in an open situation where there was a free circulation of pure air; and then, as may readily be supposed, whatever may be the severity of the dyspnœa, sanguine emission would be useless, and, in accordance with what has been previously stated, some opiate preparations should be given, without, at the same time, depriving ourselves of the use of some revulsive or diffusible excitants, the utility of which, however, I would not undertake to answer for.

Of all the complications which may arise in the course of emphysema, the most remarkable, assuredly, on account of the influence which this disease exerts upon its development, is hypertrophy with dilatation of the cavities of the heart. This complication undoubtedly demands some modifications in the treatment of the patient; but we must here never lose sight of the fact, that the dyspnœa which he experiences, is in a great measure owing to the emphysema—that is to say, to an affection which is not sensibly influenced by blood-letting; and then, as we cannot expect any great relief through its means, we must, for that very reason, make use of it sparingly.

Experience having taught me nothing positive in relation to the operation of other means which might be tried in the treatment of

emphysema, I shall conclude what I had to say upon this point, by reminding the reader that those who are affected with this disease in an uncomplicated form, are free of fever; that their appetite is commonly good, and that it ought to be satisfied, taking care only to interdict the use of heating meats, and of every thing which, by accelerating the circulation, might and would augment the habitual dyspnœa.

---

#### ERRATA.

At page 514, 14th line from the bottom, for *In those who*, read *In some of those who*, and at the 11th line from the bottom, for *in the eighth part of the cases*, read *in the eighth case*.

NOTE.—At the commencement of the paragraph in which the above errata are found, there is, most probably, an error in the French copy. The paragraph begins thus, "*In those who died*, the form of the chest was attended to," &c. It is clear that a portion only of those who died is here intended, and we may conclude, from what follows, that this portion includes eight. It would then read thus, "*In eight of those who died*," &c.









